Vol. 933 Number 1

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

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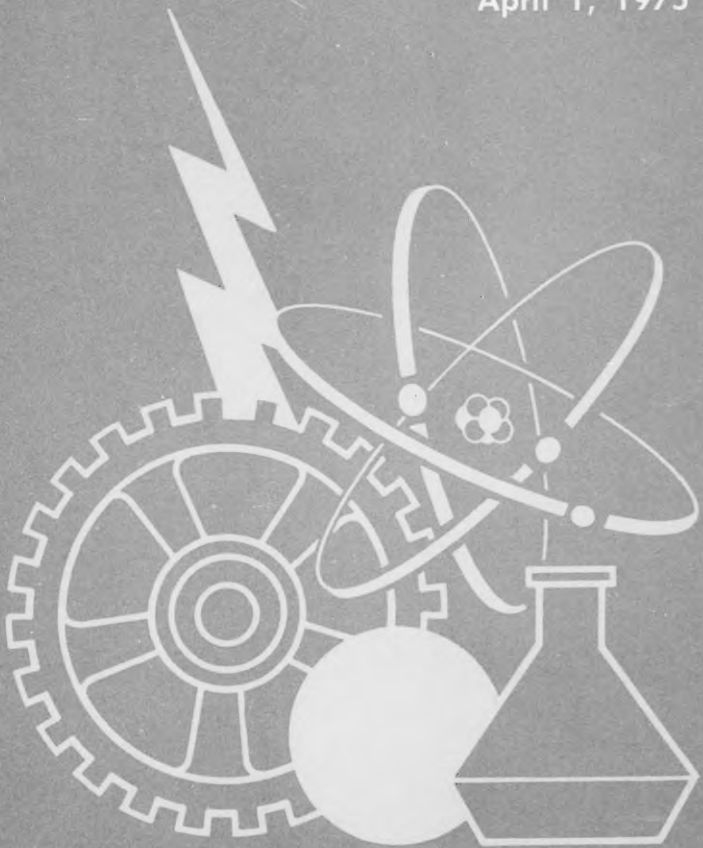
PATENTS

April 1, 1975



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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

April 1, 1975 Volume 933 Number 1

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PATENT AND TRADEMARK OFFICE NOTICES

Board of Appeals Decisions Rendered in the Month of February 1975

Examiner affirmed	152
Examiner affirmed in part	28
Examiner reversed	94
Total	274

Availability of U.S. Patent Reclassification Microfilm

The Patent and Trademark Office announces the availability of the microfilm publication "Reclassification Transfer Records" for Classification Order No. 415, of August 1974. This official record lists all the original and cross-reference patent classification changes which occurred in that reclassification.

The film provides original and cross-reference transaction records from old classification to new in all three of the following sequences:

1. New class/subclass order
2. Patent number order
3. Old class/subclass order

The publication for August 1974 consists of one reel of originals and one reel of cross-references on 16 mm negative microfilm. This set of two reels is available as follows:

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Plain 16mm Film Reel	COM–75–10160–P	$ 8.00 Domestic 10.50 Foreign
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3M Cartridge	COM–75–10160–M	8.00 Domestic 10.50 Foreign
Thread Easy	COM–75–10160–T	8.00 Domestic 10.50 Foreign

Orders must specify the NTIS accession number given above and the form in which the buyer desires to receive the microfilm (also given above). Address orders to:

National Technical Information Service
U.S. Department of Commerce
Springfield, Va. 22151

Please enclose payment in check or money order or authorization to charge the amount of the order to the buyer's NTIS deposit account or American Express Card, giving the account number.

C. MARSHALL DANN,
Mar. 4, 1975. *Commissioner of Patents and Trademarks.*

Certificates of Correction for the Week of Apr. 1, 1975

P.P. 3,584	3,816,540	3,848,897	3,858,101
Re. 27,887	3,816,563	3,849,006	3,858,116
Re. 28,100	3,816,684	3,849,487	3,858,331
D. 233,112	3,816,998	3,849,616	3,858,403
D. 233,113	3,822,645	3,850,137	3,858,625
D. 234,020	3,822,890	3,850,188	3,858,795
2,795,350	3,823,406	3,850,383	3,859,044
3,379,291	3,824,275	3,850,539	3,859,059
3,465,982	3,824,598	3,850,669	3,859,154
3,503,570	3,827,019	3,850,920	3,859,219
3,514,026	3,827,100	3,850,945	3,859,372
3,652,282	3,827,439	3,851,377	3,859,380
3,657,426	3,828,008	3,851,709	3,859,413
3,683,087	3,828,085	3,852,048	3,859,594
3,728,800	3,828,105	3,852,260	3,859,642
3,733,201	3,828,132	3,852,281	3,859,728
3,736,680	3,829,308	3,852,967	3,859,781
3,736,997	3,832,227	3,852,970	3,859,939
3,743,044	3,832,391	3,853,178	3,859,963
3,754,039	3,833,639	3,853,220	3,860,007
3,759,036	3,833,781	3,853,401	3,860,338
3,760,480	3,834,260	3,853,537	3,860,397
3,764,276	3,835,361	3,853,579	3,860,411
3,764,401	3,836,786	3,853,963	3,860,436
3,764,485	3,837,143	3,854,055	3,860,463
3,767,526	3,837,231	3,854,205	3,860,540
3,768,081	3,837,445	3,854,363	3,860,545
3,770,242	3,839,349	3,854,560	3,860,601
3,771,226	3,839,455	3,854,772	3,860,612
3,773,491	3,839,481	3,854,816	3,860,762
3,777,880	3,839,486	3,854,863	3,860,781
3,784,368	3,839,575	3,854,889	3,860,877
3,785,202	3,839,852	3,855,136	3,860,889
3,789,041	3,840,433	3,855,243	3,861,088
3,790,568	3,842,322	3,855,279	3,861,243
3,793,430	3,842,750	3,855,315	3,861,419
3,797,359	3,843,286	3,855,319	3,861,729
3,797,904	3,843,453	3,855,350	3,861,824
3,799,327	3,843,596	3,855,408	3,861,879
3,799,704	3,843,614	3,855,471	3,861,941
3,802,252	3,843,828	3,855,689	3,861,964
3,803,050	3,844,277	3,855,691	3,862,072
3,804,512	3,844,704	3,855,994	3,862,256
3,808,205	3,844,707	3,856,071	3,862,306
3,809,602	3,845,038	3,856,820	3,862,321
3,809,624	3,845,096	3,856,821	3,862,916
3,809,715	3,845,532	3,856,823	3,863,034
3,810,945	3,845,557	3,857,405	3,863,044
3,810,949	3,845,884	3,857,449	3,863,053
3,814,769	3,845,887	3,857,606	3,863,208
3,815,144	3,846,141	3,857,689	3,863,653
3,815,491	3,846,542	3,857,730	3,863,683
3,815,995	3,847,846	3,857,907	3,863,747
3,816,461	3,848,825	3,857,987	

Disclaimers

3,296,532.—*Peter Robinson*, Waltham, Mass. DIVERSITY COMBINERS. Patent dated Jan. 3, 1967. Disclaimer filed Feb. 10, 1975, by the assignee, *Raytheon Company*.

Hereby enters this disclaimer to claims 3, 4, 6, 9, 10, 11, 12 and 13 of said patent.

3,356,462.—*Nelson M. Cooke*, Great Falls, Va., and *Paul H. Hall*, Clinton, Md. DISPOSABLE MICROTITRATION PLATE. Patent dated Dec. 5, 1967. Disclaimer filed Oct. 8, 1974, by the assignee, *Dynatech Laboratories, Incorporated*.

Hereby enters this disclaimer to claims 1, 2, 3 and 5 of said patent.

3,426,899.—*Eugene J. Smith*, Valley Cottage, N.Y. AERATION APPARATUS. Patent dated Feb. 11, 1969. Disclaimer filed Oct. 16, 1974, by the assignee, *Clow Corporation*.

Hereby enters this disclaimer to claims 1–4, inclusive, of said patent.

3,525,147.—*Vernon E. Kieffer*, St. Louis, Mo. METHOD OF MAKING A FIELD MEMBER FOR A DYNAMOELECTRIC DEVICE. Patent dated Aug. 25, 1970. Disclaimer filed Oct. 16, 1974, by the assignee, *Wagner Electric Corporation*.

Hereby enters this disclaimer to claim 1 of said patent.

3,552,495.—*John Robert Fiero*, Glendora, Calif. FIRE EXTINGUISHER. Patent dated Jan. 5, 1971. Disclaimer filed Oct. 21, 1974, by the assignee, *HTL Industries Inc.*

Hereby enters this disclaimer to claims 13, 14, 15, 16, 17, 18, 19 and 20 of said patent.

3,706,672.—*Preston Kuhn Martin*, Fanwood, and *Richard Howard Kelly*, West Orange, N.J. DETERGENT POLYELECTROLYTE BUILDERS. Patent dated Dec. 19, 1972. Disclaimer filed Aug. 12, 1974, by the assignee, *Celanese Corporation*.

Hereby enters this disclaimer to claims 1–9 of said patent.

Dedications

2,854,715.—*John G. Kura*, Columbus, Ohio. METHOD OF CASTING METAL IN A MOLD CONTAINING VINYL AROMATIC BINDERS. Patent dated Oct. 7, 1958. Dedication filed Aug. 2, 1974, by the assignee, *The Battelle Development Corporation*.

Hereby dedicates to the People of the United States the entire remaining term of said patent.

3,023,164.—*Emil A. Lawton*, Woodland Hills, Calif., and *Charles M. Allen* and *Stanley Cosgrove*, Columbus, Ohio. METHOD OF LUBRICATION COMPRISING THE USE OF METAL PHTHALOCYANINE. Patent dated Feb. 27, 1972. Dedication filed Aug. 2, 1974, by the assignee, *The Battelle Development Corporation*.

Hereby dedicates to the People of the United States the entire remaining term of said patent.

3,509,427.—*Ralph A. Ruscetta*, Columbia, S.C. ELECTROLYTIC CAPACITOR CASING STRUCTURE. Patent dated Apr. 28, 1970. Dedication filed Oct. 9, 1974, by the assignee, *General Electric Company*.

Hereby dedicates to the Public the remaining term of said patent.

3,557,703.—*John E. Moorefield*, Charlotte, N.C. (Charles H. Moorefield, executor of said John E. Moorefield, deceased.) RAILWAY RAIL HANDLING APPARATUS. Patent dated Jan. 26, 1970. Dedication filed Dec. 5, 1974, by the assignee, *Chemetron Corporation*.

Hereby dedicates to the Public the remaining term of said patent.

PATENT EXAMINING CORPS

WILLIAM FELDMAN, Acting Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MARCH 15, 1975

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—M. STERMAN, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	4-4-74
GENERAL ORGANIC CHEMISTRY, GROUP 120—R. F. BURNETT, Acting Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur: Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	4-11-74
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	3-13-74
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—A. L. LEAVITT, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	6-27-74
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—R. FRIEDMAN, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	5-6-74
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-14-74
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	11-14-73
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	1-2-74
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	8-20-74
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	2-22-74
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	1-4-74
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—G. M. FORLENZA, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	7-3-74
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—D. J. STOCKING, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	7-5-74
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—R. E. PULFREY, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	7-31-74
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	6-10-74
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	9-9-74

Expiration of patents: The patents within the range of numbers indicated below expire during April 1975, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,828,487 to 2,832,958, inclusive
Plant Patents..... Numbers 1,694 to 1,697, inclusive

REISSUES

APRIL 1, 1975

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

28,380

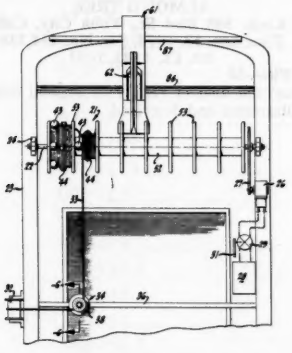
FISH LINE REELING AND BAITING APPARATUS

Kenneth F. Tison, Petersburg, Alaska, assignor to Marine Construction & Design Co., Seattle, Wash.

Original No. 3,626,630, dated Dec. 14, 1971, Ser. No. 852,165, Aug. 22, 1969. Application for reissue Apr. 10, 1972, Ser. No. 242,843

Int. Cl. A01k 79/00, 83/02, 97/00

U.S. Cl. 43—6.5 14 Claims



1. Fish line handling apparatus for fish line having spaced gangions with hooks thereon, comprising line storage reel means having provisions for orderly storage of the hooks as the line is reeled in and for releasing the hooks successively to go with the line freely as the line is being payed out from the reel means, and baiting means including a bait container having vertically slotted front and back walls and an open top, guide means extending over the top of said container and having a longitudinal slot therethrough aligned above the container wall slots, and ramp means extending from said container to said reel, whereby line unreeled from said reel means extends through the container with floats and/or weights on the line sliding along said guide means with gangions depending from the line to drag the hooks through said container and impale bait disposed therein.

28,381

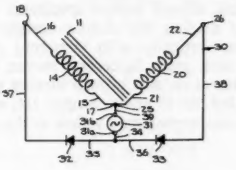
MAGNETOSTRICTIVE APPARATUS AND PROCESS

Alden P. Edson, Colorado Springs, Colo., assignor to The International Nickel Co. Inc., New York, N.Y.

Original No. 3,634,742 dated Jan. 11, 1972, Ser. No. 48,377, June 22, 1970. Application for reissue Dec. 26, 1973, Ser. No. 428,108

Int. Cl. H01v 9/00

U.S. Cl. 318—118 15 Claims



3. An electromechanical transducer [as set forth in claim 1 wherein the] *for converting electrical power to vibratory mechanical power and for exerting a major proportion of said vibratory mechanical power along an axis of desired power output comprising: a core containing bilinear magnetostrictive material and extending along the axis of desired power output, said* core [is] *being* of a hollow closed-path configuration providing a substantially continuous path of core material around a central opening and having a continuous interior cavity extending within the core material and coextensively with the path of core material around the central opening, *a first electrically conductive coil adapted to be electromagnetically coupled with the core when electric current is passed through the coil and to thereby produce a first electromagnetic field having flux directed along said desired axis of power output and a second electrically conductive coil adapted to be electromagnetically coupled with the core when electric current is passed through said second coil and to thereby produce a second electromagnetic field having flux intersecting the core in a direction transverse to the direction of flux intersecting the core from the first coil,* one of the coils [is] *being* wound within the cavity and coextensively with the path of the cavity and [has] *having* electrically conductive leads extending to the exterior of the cavity and the other *of the coils* [is] *being* wound toroidally around the exterior of the path of core material.

PLANT PATENTS

GRANTED APRIL 1, 1975

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,697

YEW TREE

John A. Youdath, 1250 E. 6th St., Beaumont, Calif. 92223

Filed Jan. 10, 1974, Ser. No. 432,224

Int. Cl. A01h *7/00*

U.S. Cl. Plt.—50 **1 Claim**

1. A new and distinct variety of yew tree, substantially as shown and described herein, characterized particularly by its vigorous, naturally dense upright growth habit, and conical or sometimes columnar form, producing symmetrical, almost perfect specimens with little or no pruning or shaping; the slender upright branches ascending almost vertically, with numerous stems densely clothed with dark green lanceolate leaves; the marginal edges of the leaves on new growth turning golden yellow from about May 1st to about August 1st; and the stems of the leaves also turning pale yellow at the same time.

3,698

ST. AUGUSTINEGRASS

Jake T. Gruis, Apopka, and Terrance P. Riordan, Altamonte Springs, Fla., assignors to The O. M. Scott & Sons Company, Marysville, Ohio

Filed Oct. 2, 1973, Ser. No. 402,716

Int. Cl. A01h *5/12*

U.S. Cl. Plt.—88 **1 Claim**

1. St. Augustinegrass, substantially as herein illustrated and described.

3,699

ALMOND TREE

Leroy J. Koch, 588 Bird St., Yuba City, Calif. 95991

Filed Jan. 17, 1974, Ser. No. 434,338

Int. Cl. A01h *5/03*

U.S. Cl. Plt.—30 **1 Claim**

1. A new and distinct variety of almond tree, substantially as illustrated and described.

PATENTS

GRANTED APRIL 1, 1975

ERRATA

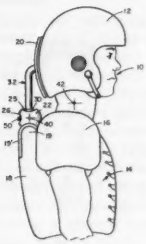
For CLASS	See PATENT NO.
052-753	3,874,148
082-036	3,874,257
320-039	3,874,551
346-108	3,874,621
254-159	3,874,632
279-50	3,874,688
351-026	3,874,774
351-41	3,874,775
351-123	3,874,776
351-168	3,874,777
264-160	3,874,910
071-111	3,874,939
075-109	3,874,940
075-173	3,874,941
096-1.5	3,874,942
096-1.6	3,874,943
096-29	3,874,944
96-36.3	3,874,945
96-48	3,874,946
96-51	3,874,947
96-56.3	3,874,948
261-91	3,875,279
210-59	3,875,357
315-39.69	3,875,469
315-39.77	3,875,470
315-151	3,875,471
315-169	3,875,472
315-169	3,875,473
315-169	3,875,474
315-193	3,875,475
318-575	3,875,468
343-52	3,875,551

PATENTS

GRANTED APRIL 1, 1975

GENERAL AND MECHANICAL

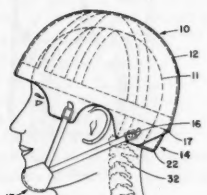
3,873,996
ARTICULATED HEAD AND NECK PROTECTOR APPARATUS
Levon Antoine Varteressian, 9018 Timberside Dr., Houston, Tex. 77025
Filed July 5, 1974, Ser. No. 486,139
Int. Cl. A42b *1/08*
U.S. Cl. 2—3 R **7 Claims**



1. A head protector apparatus for limiting extreme movements of the head of a person wearing a helmet and a jacket, said apparatus comprising:

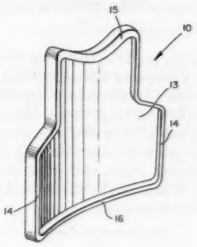
a. a socket fixedly supported by said jacket, a spherical chamber in said socket, a first slot and a second slot in said chamber, each slot having an arcuate wall;
b. a ball rotatably mounted in said chamber;
c. a track in the back of said helmet, a tracker slidably mounted in the track;
d. a control arm, one end of the arm being attached to said ball through said first slot and the opposite end of the arm being attached to said tracker;
e. a pin extending outwardly from said ball through said second slot; and
f. the length of said track and the length of the wall of each slot being such that the person's head is free to move within prescribed safe limits.

3,873,997
CERVIX GUARD FOR PROTECTIVE HEADGEAR
Elwyn R. Gooding, 120 Darwin Rd., Pinckney, Mich. 48169
Filed Apr. 23, 1973, Ser. No. 353,316
Int. Cl. A63b *71/10*
U.S. Cl. 2—3 R **3 Claims**



1. A proctective headgear assembly comprising an outer shell having sides and shaped high at the rear edge thereof so as to provide an open space below said rear edge, a yieldable inner support crown arranged in a supporting relation with said outer shell and positioned within said shell as said rear edge thereof, a cervix guard comprising a panel having a normal position extending across said rear edge and occupying said space, pin means pivotally mounting opposite ends of said panel on said shell sides, pin means being located forwardly and downwardly from said rear edge so that said panel is movable upwardly from said normal position to a position extending upwardly inside said shell at the rear edge thereof displacing a portion of said crown adjacent said shell rear edge, and resilient pad means secured to the inside of said panel.

3,873,998
BODY ARMOR SYSTEM
Lonnie H. Norris, Milford, and Philip E. Durand, Hudson, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Mar. 26, 1974, Ser. No. 454,897
Int. Cl. F41h *1/02*
U.S. Cl. 2—2.5 **7 Claims**

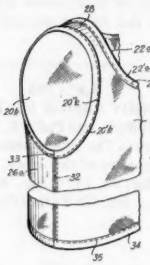


1. A coordinated protective body armor system to provide protection against low caliber missiles which will also minimize escape of spall from within said system, cushion the brittle elements of the system against breakage, and provide cushioning protection to protect the head and neck of the wearer from injury upon impact against the armor system comprising a ceramic/fiber glass composite armor plate which comprises a ceramic face plate bonded to laminate back plate of resin-bonded plies of a glass fiber fabric, a foamed plastic spall protective container for said ceramic/ fiber glass composite armor plate which is disposed so as to completely cover said ceramic/fiber glass composite armor plate, and a carrier for said ceramic/fiber glass composite armor plate and said foamed plastic spall protective container comprising a spall shield which overlies said foamed plastic spall protective container and said ceramic/fiber glass composite armor plate and which comprises a plurality of plies of a woven ballistic fabric.

3,873,999
UNDERSHIRTS AND SIMILAR SLEEVELESS GARMENTS
William Walter Artzt, 333 Sunset Ave., Palm Beach, Fla. 33480
Filed Oct. 25, 1973, Ser. No. 409,741
Int. Cl. A41b *9/06*
U.S. Cl. 2—113 **2 Claims**

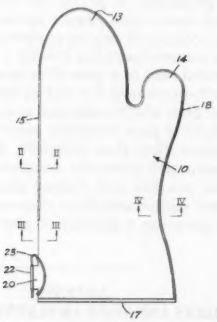
1. A sleeveless garment of the described character consisting of a single, substantially rectangular piece of two-way stretchable knit fabric which is more stretchable in the longitudinal direction of said rectangular fabric piece than in the direction at right angles thereto, with the opposite end portions of said rectangular fabric piece defining front and back

body portions, respectively, of the garment, said fabric piece having arcuate elongated cutouts in its opposed side edges between said end portions and an oval neck opening centered laterally between said cutouts with the fabric of said piece between said neck opening and said cutouts defining seamless shoulder strap portions integral with said front and back body portions and extending generally in said longitudinal direction, longitudinally stretchable stitching joining together the respective side edges of said front and back body portions to



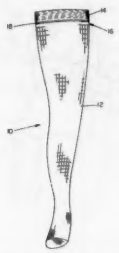
form side seams at the inside of the garment with said cutouts defining armholes above said side seams, the edge portions of said neck opening and said armholes being folded back against the adjacent fabric of said piece at said inside of the garment, and longitudinally stretchable stitching extending along said folded back edge portions and securing the latter to said adjacent fabric against which said edge portions are folded back for finishing off said neck opening and armholes and the upper ends of said side seams.

3,874,000
HOT WATER MITT
Max S. Altman, 362 Knowlton Ave., Kenmore, N.Y. 14217
Filed Jan. 21, 1974, Ser. No. 435,256
Int. Cl. A41d *19/00*
U.S. Cl. 2—158 **3 Claims**



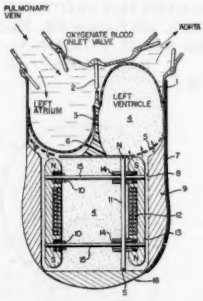
1. A double wall mitt structure comprising a pair of blank sheets of flexible material juxtaposed and jointly folded along a medial line whereby the folded edge forms one marginal edge of the mitt structure, the ends of said blank sheets at one end of the structure and at the side opposite the folded edge being shaped to form hand and thumb receiving portions and secured along their edges to form a central hand receiving space and double wall portions at opposite sides of the hand receiving space, the edges of the inner and outer blank sheets at the other end of said structure being separately attached along their edges to form a central hand receiving opening and close the double wall structures at opposite sides thereof, and means for introducing heating liquid to said double wall spaces.

3,874,001
THERAPEUTIC STOCKING
Donald Patience, Barrington; Roger T. Swallow, Crystal Lake; Edward G. Hartigan, Schaumburg, all of Ill., and Herbert Knohl, Seneca, S.C., assignors to Colgate-Palmolive Company, New York, N.Y.
Filed Mar. 13, 1973, Ser. No. 340,727
Int. Cl. A61f *13/08*
U.S. Cl. 2—240 **10 Claims**



1. A full length therapeutic stocking comprising a circumferentially elastic boot portion including elastomeric filament containing elastic yarn; a narrow elastic band formed of non-slip elastomeric webbing material and having inner and outer surfaces; and an attachment portion comprising a single-ply circumferential strip at the top of said boot portion, said strip having inner and outer surfaces; said band being attached to said strip by over-edge stitching with adjacent portions of said inner surfaces substantially aligned.

3,874,002
PULSATILE MAGNETO-MOTIVE ARTIFICIAL HEART
Waldemar Helmut Kurpanek, Ontario, Canada
Filed Sept. 7, 1972, Ser. No. 287,062
Int. Cl. A61f *1/24*
U.S. Cl. 3—1 **10 Claims**



5. A permanently implantable artificial heart for pumping blood around a circulatory system, said heart comprising:
a casing having an upper part and a lower part;
first and second chamber means disposed in said upper part, each chamber means capable of functioning both as an atrium and a ventricle;
a chamber wall dividing said first and second chamber means and preventing communication therebetween;

a first inlet and first outlet passage of said first chamber means, said first inlet passage having a first magnetic one-directional inlet valve and said first outlet passage having a first magnetic one-directional outlet valve, said first inlet and first outlet valves allowing blood to flow into and out of said first chamber means respectively;

a second inlet and second outlet passage of said second chamber means, said second inlet passage having a second magnetic one-directional inlet valve and said second outlet passage a first magnetic one-directional outlet valve, said second inlet and said second outlet valves allowing blood to flow into and out of said second chamber means respectively;

a first elastic diaphragm sac separating said first chamber means from the lower part of said casing, said first elastic sac being expandable into said first chamber means to substantially fill the space therein;

a second elastic diaphragm sac separating said second chamber means from the lower part of said casing, said first elastic sac being expandable into said second chamber means to substantially fill the space therein, said first magnetic one-directional magnetic inlet and outlet valves forming a first one-directional check valve system, and said second magnetic one-directional magnetic inlet and outlet valves forming a second one-directional check valve system of said artificial heart;

pump chamber means rigidly disposed in the lower part of said casing;

reciprocating bistable electro-magnetic pumping means for generating a reciprocating pumping motion rigidly disposed in said pump chamber means and having an hydraulic pumping medium and at least two permanent magnets rigidly mounted in said pump chamber means so that the poles of one magnet face the poles of the other at a given distance therebetween, said facing poles having opposite polarity thus forming a closed ring flux field that cannot be magnetized under a given operating condition; ferromagnetic piston means reciprocably slidable between the poles of said permanent magnets; electromagnetic coil means rigidly disposed between said permanent magnets and operatively surrounding said ferro-magnetic piston means; means for energizing said coil with an alternating dc pulse so that said coil generates an alternating electromagnetic flux field to cause said ferromagnetic piston means to be continuously magnetically polarized in opposite directions and thereby execute said reciprocating pumping motion between said magnetic poles by being alternately repelled and attracted therebetween; means permitting said reciprocating pumping means to alternatively pump said pumping medium into said first and second elastic diaphragm sacs to fill said sacs and cause expansion thereof into respective ones of said first and second chamber means and thereby generate pulsatable motion in said artificial heart which forces blood, under the agency of said first and second one-directional check valve system, in a one-directional mode around said circulatory system.

3,874,003

ARTIFICIAL HIP JOINT

Heinz Moser, Selzach, and Kurt Karpf, Holderbank, both of Switzerland, assignors to Oscobal AG, Selzach, Solothurn, Switzerland

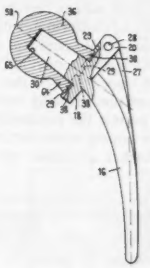
Filed Apr. 4, 1973, Ser. No. 347,621

Claims priority, application Switzerland, Apr. 6, 1972, 4854/72

Int. Cl. A61F *1/00*

U.S. Cl. 3—1 **21 Claims**

1. An artificial hip joint, comprising an artificial femur head having a femur shank and ball head mounted thereon, and a socket, said femur shank having a support pin projecting from an upper end thereof and a collar about the base of said pin, said ball head having a bore which is disposed on said pin of the femur shank and is secured from unintentional twisting by pegs projecting axially at a face of the ball head for cooperative engagement with depressions in said collar of the femur shank, said bore of the ball head having an axis offset from a



diameter line of the ball head, whereby said ball head may be disposed on said pin and fixed by said pegs and depressions in various relative angular positions for selection of various positions of said ball head relatively to said femur shank.

3,874,004

SYMES ANKLE JOINT

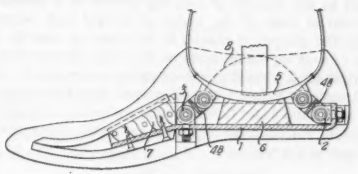
Denis Ronald William May, London, England, assignor to J. E. Hanger & Company Limited, London, England

Filed May 28, 1974, Ser. No. 474,064

Claims priority, application United Kingdom, May 31, 1973, 25978/73

Int. Cl. A61f *1/04, 1/08*

U.S. Cl. 3—33 **7 Claims**



1. An artificial ankle joint comprising a metal sole plate within an artificial foot, the said sole plate carrying pivot bearings for a posterior upwardly and forwardly sloped swinging link and an anterior upwardly and rearwardly sloped swinging link, the said links being pivoted at their upper ends to posterior and an anterior lugs forming part of patient weight-bearing structure, and a pre-compressed resilient stress-relieving control block located between the sole plate and the weight-bearing structure.

3,874,005

CHILD'S SAFETY PLAYPEN FOR USE IN WATER

Kenneth E. Badon, Magnolia Life Bldg., Suite 600, P.O. Box 442, Lake Charles, La. 70601

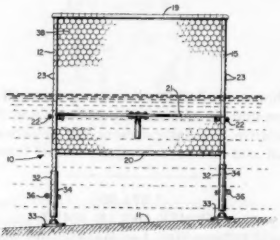
Filed Aug. 13, 1973, Ser. No. 387,969

Int. Cl. E04h *3/19*

U.S. Cl. 4—171 **6 Claims**

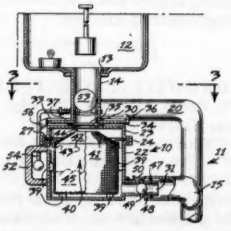
1. A playpen for providing a safe play environment for a small child or infant in water of significant depth comprising: a water compatible, relatively lightweight, portable playpen enclosure structure defining an enclosure of substantial size sufficient to allow a small child or infant to freely move around therein, said playpen enclosure structure being provided with members having openings therein which allow water to flow into the enclosure, said playpen enclosure structure including

a. a basic playpen support frame;
b. playpen platform means supported on said basic support frame for supporting the small child or infant within said enclosure during play in the water, said platform means being rigid;
c. playpen wall enclosure means carried by said basic support frame around said platform means for restricting the small child or infant to said platform means;
d. playpen leg support means connected to said basic frame for supporting said basic frame on the water bottom, said playpen leg support means being independently adjustable in length to permit the positioning of said playpen support frame on a sloping water bottom, said playpen leg support means further comprise swivel base portions



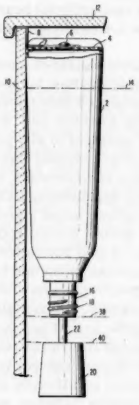
whereby said playpen leg support means are self leveling and thereby conform to an uneven water bottom; and
e. variable support means connected within said platform, said basic frame and said leg means for allowing variation of the vertical position of said platform means with respect to the bottom of said leg means by a substantial amount at least of the order of several feet; whereby, when the playpen is placed in the water so that the bottom of said leg means rests on the water bottom and the vertical level of said platform means is located by using said variable support means at least near the surface of the water and water flows into the enclosure, a small child or infant placed in the enclosure can safely play and move around in the water.

3,874,006
ORGANIC COMPOST COLLECTOR FOR SINK DRAIN SYSTEM
Ann Lance Ritter, 1001 Balmoral Dr., Nashville, Tenn. 37220
Filed Mar. 4, 1974, Ser. No. 447,841
Int. Cl. E03c *1/18, 1/26;* **A47k** *1/14*
U.S. Cl. 4—189 **13 Claims**



1. An organic compost collector for a sink drain system including a sink, a sink drain outlet, and sink drain pipe, comprising:
a. a receptacle having a solid enclosure wall defining a chamber for receiving effluent from said sink,
b. an inlet opening in said wall adapted to be detachably connected in said drain system in fluid communication with said sink drain outlet,
c. an outlet opening in said wall adapted to be detachably connected in said drain system in fluid communication with said drain pipe,
d. a screen member porous to liquids, said screen member being a barrier to the passage of solid waste material larger than a predetermined size, and
e. means mounting said screen member within said chamber and in the path of effluent moving toward said outlet opening, to retain said solid waste material larger than said predetermined size within said chamber.

3,874,007
LIQUID DISPENSING APPARATUS AND METHOD FOR TOILET FLUSH
John E. Dolan, Old Orchard St., Quarry Height, Harrison, N.Y. 10604
Continuation-in-part of Ser. No. 114,265, Feb. 10, 1971, abandoned. This application July 31, 1972, Ser. No. 276,285
Int. Cl. E03d *9/02*
U.S. Cl. 4—228 **11 Claims**



1. Apparatus for dispensing liquid into a toilet flush tank which is normally filled to a given water level, is discharged during a flush to reduce the water level and then is refilled to the given water level preparatory to the next flush, said apparatus comprising the following:
a supply vessel for a concentrated liquid, said supply vessel having an outlet opening,
means for supporting the apparatus in a flush tank at an orientation where the supply vessel outlet opening lies below the level of concentrated liquid therewithin, said supply vessel outlet opening being in communication with the toilet flush tank at all times regardless of the water level,
an upwardly open dilution vessel having an opening which is in free substantially horizontal communication with water in the flush tank to permit its filling by water in the flush tank,
means for supporting the dilution vessel at a position under the supply vessel outlet opening, said dilution vessel being constructed to remain spaced from said outlet opening regardless of the water level in the toilet flush tank whereby lowering of the water level in the flush tank below the dilution vessel opening will result in a mixture in the dilution vessel of concentrated liquid from the supply vessel and water retained by the dilution vessel, thereby providing a dilute liquid which will be dispensed

into the flush tank water after it returns to the elevation of the supply vessel outlet opening.

3,874,008

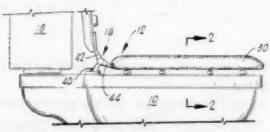
WATER CLOSET SEATS AND COVERS THEREFOR

Archie E. Warnberg, 3600 N.W. 43rd St., Oklahoma City, Okla. 73112

Continuation-in-part of Ser. No. 97,939, April 15, 1971, abandoned, which is a continuation-in-part of Ser. No. 77,103, Oct. 1, 1970, abandoned. This application Jan. 2, 1974, Ser. No. 430,061

Int. Cl. A47k *13/00, 13/14, 13/02*

U.S. Cl. 4—234 **10 Claims**



1. A water closet assembly comprising:

a bowl having an upper side, a front and a rear;

a seat mounted on the upper side of said bowl and having a substantially planar lower side and a back side;

a hinge structure pivotally connecting said seat to said bowl for pivotation about a horizontal axis, said hinge structure including:

a first portion secured to the upper side of the bowl at the rear thereof; and

a pair of arms projecting from said first portion and secured to the lower side of the seat;

a plurality of anchoring devices projecting downwardly from the lower side of said seat and horizontally spaced from each other around said seat; at least two of said anchoring devices supporting the seat on and spacing it from the bowl in one position of the seat; and

a flexible annular cover including an inner peripheral edge and an outer peripheral edge each secured to said anchoring devices and further including a portion between said inner and outer peripheral edges stretched tautly across the upper side of said seat and extending at least to the planar lower side of said seat, said cover having a pair of spaced slots extending thereinto from the outer peripheral edge thereof toward the inner peripheral edge and each receiving a part of one of said arms where the respective arm is attached to the lower side of said seat.

3,874,009

SUPPORTING APPARATUS FOR AN UPPER BED DECK OF A MOBILE HOME VEHICLE

Teizou Nosaka, Chiryu; Tohru Mase, Kariya; Toshitaka Tsukiyama, Toyoda; Keiichi Ohashi, and Yasushi Ito, both of Kariya, all of Japan, assignors to Toyota Shatai Kabushiki Kaisha, Kariya-shi, Aichi-ken, Japan

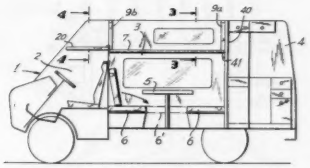
Filed Sept. 5, 1973, Ser. No. 394,596

Claims priority, application Japan, Sept. 7, 1972, 47-89787

Int. Cl. B62d *33/06;* **B60p** *3/32*

U.S. Cl. 5—9 R **19 Claims**

1. In a vehicle body having side walls, a ceiling wall, a lower bed deck and an upper bed deck, a supporting apparatus for said upper bed deck comprising a pair of first rail means having channel-like cross-section opposed to each other in the longitudinal direction of said vehicle body, said first rail means being provided along the ceiling wall of the vehicle body in the width direction of said vehicle body and being spaced from each other by a distance corresponding to the length of said bed deck, a pair of first roller means attached proximate one side of the front and rear edges of said upper bed deck in the longitudinal direction thereof for rolling in said first rail means, fixing means for releasably fixing the upper bed deck longitudinally at a storage position along the ceiling wall, and supporting means provided on the vehicle body for horizontally supporting said upper bed deck at an operational position intermediate said ceiling wall and said lower bed deck, said position being suitable for supporting a sleeping individual,



said first pair of rail means having corresponding first openings into which said first roller means may be inserted for sliding along said rail means to guide the upper bed deck from said operational position toward said storage position, whereby the upper bed deck may be supported horizontally at the operation position thereof and supported for storage along the ceiling wall to provide unencumbered living space in a vehicle room without interrupting the light from and the sight through a window in a wall.

3,874,010

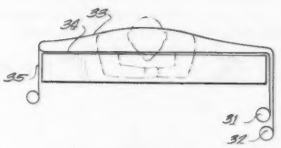
OCCUPANT TURNING DEVICE FOR BED

William M. Geary, 9347 Crawford Ave., Evergreen Park, Ill. 60642

Division of Ser. No. 255,427, May 22, 1972, Pat. No. 3,808,615. This application Mar. 15, 1974, Ser. No. 451,434

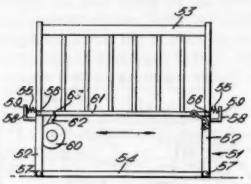
Int. Cl. A61g *7/10*

U.S. Cl. 5—61 **4 Claims**



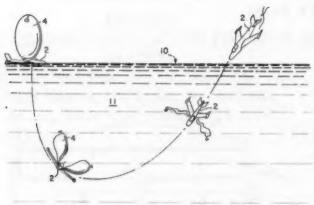
1. In a conventional bed assembly having a bed frame and a mattress and box spring therefor, the improvement comprising means for turning and shifting a body of an occupant to the various positions of sleep by the occupant including a strap of folded sheeting with one fold under the body and extending across the bed, and another fold joined to the first fold parallel to the edge of the bed and extending over the body, and reels at the edges of the bed to each of which an end of the sheeting is affixed for adjusting the position of the occupant.

3,874,011
CHILDREN'S OR INFANT'S FURNITURE
Frederick Bartholomew Walsh, 17 Grange Park Ave., Raheyn, Dublin, 5; and Leslie Laurence Grennan, 16 Broad Meadow, Swords, both of Ireland
Filed Jan. 12, 1973, Ser. No. 322,994
Int. Cl. A47d 9/02; A61g 7/10
U.S. Cl. 5—108 **4 Claims**



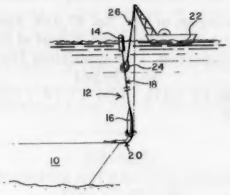
1. A child's cot comprising a cradle-portion, a stretcher member for resting upon a support surface, uprights pivotally connected to the cradle-portion at their upper ends and to the stretcher member at their lower ends so as to allow limited oscillatory movement of the cradle-portion, drive means for actuating the cradle-portion in such oscillatory movement, and at least one resilient cushioning element attached to the uprights which engages the cradle-portion, to apply cushioning pressure thereto in at least one direction laterally of the stretcher member.

3,874,012
FLOTATION DEVICE FOR A CRAFT
Anthony Florio, San Francisco, Calif., assignor to The Raymond Lee Organization Inc., New York, N.Y., a part interest
Filed Nov. 29, 1973, Ser. No. 419,915
Int. Cl. B63b 21/52
U.S. Cl. 9—9 **4 Claims**



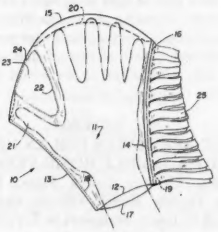
1. A flotation device for a craft, comprising
a compartment in the craft opening on the outside of the craft;
a deflated balloon in the compartment;
a source of compressed air coupled to the balloon; and
a cover on the outside of the craft enclosing the compartment and affixed to the craft by bolts which explode at a predetermined magnitude of pressure, said cover being affixed to the balloon and separating from the craft when the pressure on the outside thereof exceeds the predetermined magnitude above atmospheric pressure thereby removing the balloon from the compartment and causing it to be filled with air from the source of compressed air to float the craft to the surface when it is in a body of water.

3,874,013
BUOY DEVICE FOR LOCATING AND RETRIEVING SUNKEN VESSELS
Gerald E. Hudson, 815 S. 136th, Seattle, Wash. 98168
Filed Jan. 21, 1974, Ser. No. 435,275
Int. Cl. B63b 21/52
U.S. Cl. 9—9 **10 Claims**



10. A rescue device for locating and retrieving sunken vessels comprising:
first buoy means connected to buoy orientation means mounted on said vessel and adapted to enable said first buoy means to float freely above said vessel when said rescue device is in operation regardless of the orientation of said vessel;
finger means disposed about said first buoy means and adapted to move inwardly towards said first buoy means when subjected to a force component directed essentially towards said buoy orientation means and to resist movement when subjected to a force component directed essentially away from said buoy orientation means; and
second buoy means connected to said first buoy means by a line, said second buoy means being free to float on the surface of the water in which said vessel is submerged when said rescue device is in operation, said line permitting said vessel to be retrieved by guiding a retrieving ring down to said first buoy means and over said finger means for engagement therewith.

3,874,014
SWIMMING GLOVES
Joseph A. Davey, 250 Beach 134th St., Rockaway Park, N.Y. 11694
Filed Feb. 6, 1974, Ser. No. 439,915
Int. Cl. A63b 31/02
U.S. Cl. 9—308 **1 Claim**



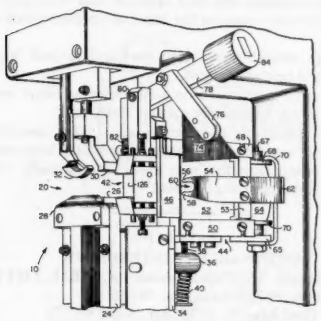
1. A swimming glove of the character described suitable for placement on either the right hand or the left hand of a swimmer, said glove comprising, a first sheet of thin flexible plastic material having a narrow end and a wider arcuate end joined by diverging sides so as to conform generally to the outline of a hand with outspread fingers and thumb, a second sheet of thin flexible plastic material substantially identical in shape and size to said first sheet, said sheets being aligned, one on top of the other, and joined together by heat sealed seams extending along the sides of said sheets and a seam forming a thumb stall to form a mitten-like glove with the arcuate ends

of said sheets adjacent the finger portion of the glove being substantially open and not joined together, the arrangement being such that, when placed on a swimmer's hand with the thumb inserted in the thumb stall, the narrow ends of said sheets loosely encircle the swimmer's wrist so that water can enter and drain freely from the glove at both essentially open ends of the glove.

3,874,015
ROCKER PLATFORM EDGE BINDER

John J. Decoulos, Peabody, and Eugene E. Simpson, Lynn, both of Mass., assignors to Boston Machine Works Co., Lynn, Mass.

Filed Nov. 8, 1973, Ser. No. 413,861
Int. Cl. A43d *43/06*
U.S. Cl. 12—24.5 **11 Claims**



1. A device for applying a tape to the edge of a workpiece and the margins on opposite faces of the workpiece for workpieces having uniform as well as non-uniform edge profiles, said device comprising:

a. a body having a working face;

b. a first holding member having a working face, said first folding member operatively connected to said body;

C. a second folding member having a working face, said second folding member operatively connected to said body, said first and second folding members relatively movable with respect to one another;

d. said working face of said first folding member being disposed in a plane that is substantially in spaced parallel relationship with a plane in which said working face of said second folding member is disposed, said working face of said body being disposed in a plane that is substantially in perpendicular relationship with said planes in which said working faces of said first and second folding members are disposed;

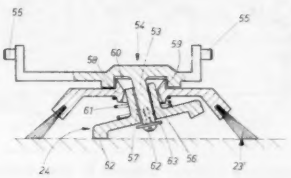
e. a guideway formed between said working faces of said body and said first and second folding members, said guideway having a substantially U-shaped profile, the distance between said working faces of said first and second folding members defining a guideway channel that is adapted to receive the tape and the workpiece;

f. said working face of said body that is disposed within said guideway channel being operative to press the tape against the edge of the workpiece as the tape and the workpiece are fed through said guideway, said working faces of said first and second folding members operative to press the tape against the margins of the workpiece on opposite faces thereof as the tape and the workpiece are fed through said guideway, said working faces of said first and second folding members relatively movable towards and away from each other for varying the size of said guideway channel as a function of the edge profile dimension of the workpiece passing through said guideway for accomodating uniform and non-uniform workpiece edge profiles.

3,874,016
SWEEPER

Johannes Liebscher, Nassau, Lahn, Germany, assignor to Leifheit International Gunter Leifheit KG, Wuppertal-Barmen, Germany

Filed Aug. 20, 1973, Ser. No. 389,930
Claims priority, application Germany, Aug. 19, 1972, 2240852
Int. Cl. A47l *11/33*
U.S. Cl. 15—42 **8 Claims**

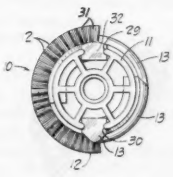


1. In a sweeper, a combination comprising a housing having a circumferential sidewall and an open side which normally faces a surface to be swept said housing being movable to and fro in opposite directions over said surface; rotary brush means in said housing and partly projecting through said open side for sweeping said surface; a cupped auxiliary brush in said housing and having an upright annulus of bristles which project through said open side and have free ends located in a common plane; mounting means mounting said auxiliary brush for tilting movement in dependence upon the direction of movement of said housing; an inclined drive wheel mounted within the confines of said annulus for axial movement inwardly and outwardly of said open side and cooperating with said auxiliary brush for rotating the same about an upright axis, said drive wheel having a rim; and biasing means biasing said drive wheel in a direction outwardly of said open side so as to maintain contact of said rim of said drive wheel with the surface to be swept.

3,874,017
ROTARY BRUSH ASSEMBLY

Russell H. R. Parker, Cleveland, Ohio, assignor to Superior Brush Company, Cleveland, Ohio

Filed July 18, 1973, Ser. No. 380,484
Int. Cl. A46b *7/10*
U.S. Cl. 15—182 **5 Claims**



1. A rotary brush assembly comprising a rigid, one-piece extruded, molded, or cast roll including as an integral structure inner and outer radially spaced coaxial walls and a plurality of circularly spaced ribs extending lengthwise of said roll between said walls, said outer wall having slot means formed therein, and brush strip means carried in said slot means.

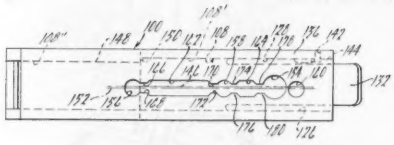
3,874,018
WINDSHIELD WIPER CONSTRUCTION

Johan H. van den Berg, Hasselt; Albert J. G. Hoebrechts, Mechelen Bovelingen, and Alex. H. A. M. van Eekelen, Hasselt, all of Belgium, assignors to Monroe Belgium N.V., Sint-Truiden, Belgium

Continuation-in-part of Ser. No. 250,340, May 4, 1972, Pat. No. 3,837,033. This application June 25, 1973, Ser. No. 373,411

Int. Cl. B60s *1/40*

U.S. Cl. 15—250.32 **34 Claims**



1. A connecting element adapted to detachably secure a windshield wiper blade assembly on windshield wiper arms of the type having outwardly projecting boss portions and/or inwardly projecting recessed areas,

said connecting element comprising means defining an elongated channel adapted to removably receive wiper arm ends therewithin,

said channel having a first portion of a first predetermined width into which wiper arm ends of approximately said first predetermined width are insertable, and a second portion of a second predetermined width into which wiper arm ends of approximately said second predetermined width are insertable,

at least one boss receiving means associated with each of said portions of said channel cooperable with the bosses of wiper arm ends inserted into said recess portions, and first and second movable retaining fingers formed integrally of said element, one of said fingers adapted for engagement with said recessed areas of certain types of said wiper arm ends, and the other of said retaining fingers being cooperable with wiper arm ends having boss portions thereon for causing positive engagement of said boss portions with selected of said boss receiving means.

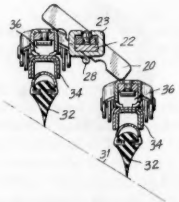
3,874,019
WINDSHIELD WIPER ADAPTER

Peter J. Speth, 239-25 88th AVe., Bellerose, N.Y. 11426

Filed Sept. 7, 1973, Ser. No. 395,215

Int. Cl. B60s *1/28, 1/40*

U.S. Cl. 15—250.32 **12 Claims**



11. An adapter as claimed in claim **10,** wherein said wiper blade engaging means includes means for removably mounting said wiper blade engaging means on said drive arm.

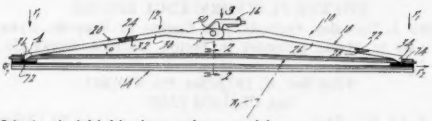
3,874,020
WINDSHIELD WIPER UNIT

Alex H. A. M. van Eckelen, and John H. van den Berg, both of Hasselt, Belgium, assignors to Monroe Belgium N.V., Sint-Truiden, Belgium

Filed Feb. 8, 1973, Ser. No. 330,752

Int. Cl. B60s *1/38*

U.S. Cl. 15—250.42 **42 Claims**



34. A windshield wiper unit comprising

a wiper assembly including a relatively flexible wiper blade, a bridge assembly disposed adjacent said wiper assembly for operatively securing the same to an associated wiper arm,

said bridge assembly including first and second hingedly connected bridge sections,

a force applying element on said wiper element and arranged along a generally arcuate path, and

means for adjustably connecting said bridge assembly to said wiper assembly in a manner such that at least one end of said bridge assembly may move longitudinally relative to said force applying element.

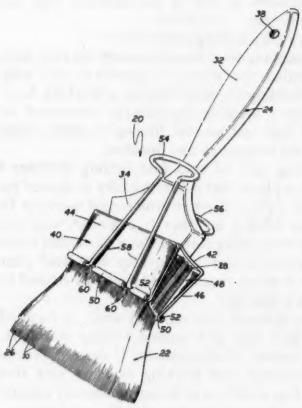
3,874,021
DISPOSABLE PAINTBRUSHES

Herbert V. Jacobs, The Philadelphian Apt. 18B31, 2401 Pennsylvania Ave., Philadelphia, Pa. 19130

Filed Mar. 5, 1973, Ser. No. 337,772

Int. Cl. A46b *3/08*

U.S. Cl. 15—202 **2 Claims**



1. In combination, a paint brush and a releasable holder therefor, said holder comprising a handle having a clip secured thereto, said clip being of a paper-binder type having a pair of integral sidewalls forming a mouth therebetween for releasably holding said brush, said brush being formed of plural strips of woven, seat-belt material, each strip comprising a binding having filler threads with warp threads woven therethrough, said threads being formed of multifilament nylon yarn said filler threads being loosely associated and having no lateral support, said loosely associated filler threads serving as bristles for the brush and being coated with a stiff-

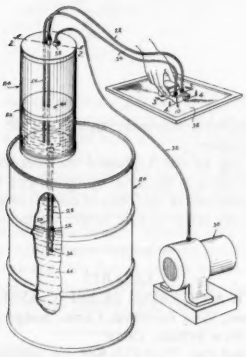
ening agent, said strips being disposed on top of each other and secured together by plural stitches through their bindings.

3,874,022

MEANS FOR REMOVING INK FROM A SCREEN AND INCLUDING A CLEANING HEAD AND ACCUMULATOR

Frank W. Wogoman, South Bend, and Paul W. Smeltzer, Elkhart, both of Ind., assignors to Wells Electronics, Inc., South Bend, Ind.

Filed Mar. 19, 1973, Ser. No. 342,740
Int. Cl. A47l 7/00
U.S. Cl. 15—321 **4 Claims**



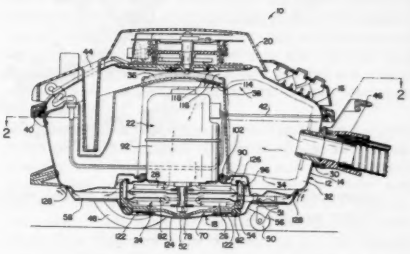
1. Apparatus for removing ink from a screen utilized in a silk screen printing process with a solvent, said apparatus comprising a cleaning head having first and second spaced orifices therein, accumulator means for collecting said solvent after removal of said ink from the screen, said accumulator means including a side wall and upper and lower end walls cooperating to define a chamber within the accumulator means, first opening means in said accumulator means through which a vacuum is formed in said chamber, second opening means in said accumulator means, conduit means extending between said second opening means and said second orifice placing said second opening means and second orifice in flow communication, other conduit means having its one end connected to said first orifice and having its other end adapted for placement in a supply of said solvent, said cleaning head adapted to be placed over said screen and having a vacuum formed between said first and second orifices, and float means within said chamber, said float means being shiftable between the end walls of said accumulator means as said chamber fills with solvent entering from said second opening means, said float means having a draft line representing the depth the float means extends into said solvent when floating thereon, said first opening means being located above said draft line in all operative positions of said float means, said float means carrying means for blocking said first opening means to reduce the vacuum in said chamber as said float means is shifted by said solvent to a selected position within said chamber.

3,874,023

RESILIENTLY MOUNTED MOTOR AND FAN ARRANGEMENT FOR A CANISTER CLEANER OR THE LIKE

Donald B. Tschudy, Canton, Ohio, assignor to The Hoover Company, North Canton, Ohio

Filed Sept. 13, 1973, Ser. No. 397,149
Int. Cl. A47l 9/22
U.S. Cl. 15—326 **11 Claims**



1. A resiliently mounted motor and air moving arrangement for a floor care appliance including;

a. a bottom pan for said floor care appliance with floor-engaging means situated in the bottom thereof,

b. a diffuser and fan structure situated above said bottom pan,

c. first resilient means disposed between said bottom pan and said diffuser and fan structure and supported by said bottom pan for providing a mounting affording resiliency therebetween,

d. said motor being mounted to and above said diffuser and fan structure and resting thereon, and

e. second resilient means mounted with said motor, said second resilient means being disposed between the main part of the housing and said motor for resiliently segregating the main portion of the housing for said floor care appliance from said motor and said diffuser and fan structure, whereby said bottom pan and said main portion of said floor care appliance is isolated from noise and vibration generated by said motor and said air moving arrangement.

3,874,024

HOSE COUPLING ARRANGEMENT FOR PNEUMATICALLY ACTUATED FLOOR CARE APPLIANCES

Roger S. Ford, Memphis, Tenn., assignor to The Hoover Company, North Canton, Ohio

Filed Sept. 13, 1973, Ser. No. 397,150
Int. Cl. A47l 9/00
U.S. Cl. 15—339 **5 Claims**

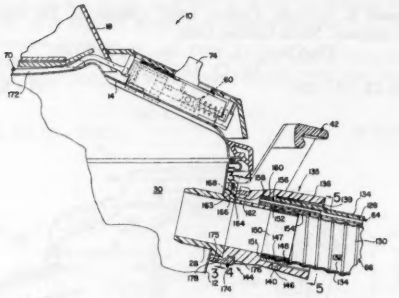
1. A suction cleaner appliance having an on-off switch that is fluid actuated and a hose coupling arrangement therefor, the combination including;

a. a first coupling structure mounted with said floor care appliance,

b. a second coupling structure directly couplable with said first coupling structure,

c. integral, discrete passageway means in each of said first and second coupling structures for the passage of fluid for said fluid actuation, said discrete passageway means in said first and second coupling structures in direct communication with one another when said first and second coupling structures are coupled, and

d. said hose coupling arrangement including another directly connected passageway means, when said first and



second coupling structures are coupled, for the passage of cleaner suction air.

3,874,025

HINGE ARRANGEMENT FOR ARTICULATED WINDSHIELD WIPER BLADES

Irwin C. Cone, Littleton, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed June 18, 1973, Ser. No. 371,314
Int. Cl. B60s *1/02, 1/38*
U.S. Cl. 15—250.42 **11 Claims**

8. A low silhouette windshield wiper blade assembly comprising an elongate elastomeric squeegee wiping element, an elongate squeegee-retaining backing member and a pressure-distributing superstructure slidably connected to the backing member at spaced points therealong, said superstructure comprising:

a molded plastic primary yoke member having an aperture non-circular in cross-section disposed transversely through the yoke near each of its end extremities;

a pair of molded plastic secondary yokes each having intermediate its ends an aperture non-circular in cross-section disposed transversely through the yoke;

said secondary yoke apertures each individually having a cross-section which is non-congruent with the cross-section of the apertures of the primary yoke; and

a non-circular hinge member of high modulus material pivotally connecting each of said secondary yokes with the respective ends of the primary yoke through a non-uniform cross-sectioned channel defined by alignment of the respective apertures of the primary yoke individually with each of the secondary yokes, said channel so dimensioned as to restrict the angle of relative rotation of the primary and secondary yokes about the hinge members.

3,874,026

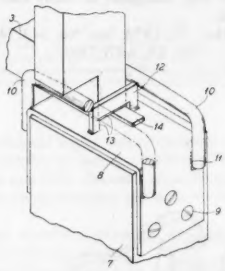
DOOR GUIDE LOCKING MEANS

Billie J. Uphoff, Morton, Ill., assignor to Morton Buildings, Inc., Morton, Ill.

Filed Aug. 30, 1973, Ser. No. 392,880
Int. Cl. E05f *5/02*
U.S. Cl. 16—82 **1 Claim**

1. Latching means for laterally movable doors to close and open an opening in a building wall having centrally disposed door guide means at the bottom of said opening with a stop member to position a pair of doors in edge to edge relationship when closing said opening, wherein the improvement comprises,

a projecting latch member on the lower inner end of a door, said stop member having a notch in the lower portion thereof to receive said latch member when said door is in closed position,



said latch member being the shorter leg of an integral L-shaped member,

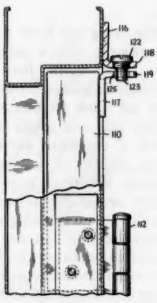
the longer leg of the L-shaped member being disposed vertically between the inner upright frame member of the door and the end of the bottom door frame member, and means firmly securing said longer leg in such position.

3,874,027

SHOCK ABSORBING BEARING ASSEMBLY

John S. Parsons, West Hartford, Conn., assignor to The Stanley Works, New Britain, Conn.

Filed Oct. 25, 1973, Ser. No. 409,625
Int. Cl. E05d *9/00*
U.S. Cl. 16—128 **16 Claims**



1. A shock absorbing bearing assembly comprising a pair of bearing members, one of said members including a stud and being mountable on one of a hinged door and door frame for coaction with the other member mounted on the other of said door and door frame, the stud being in substantial alignment with the door hinge axis, and the other member including an arcuate abutment surface spaced from said stud during normal operation of the hinged door and engaged by said stud only when a wracking force is exerted on the door.

3,874,028
BEARING FOR SWIVEL HINGES

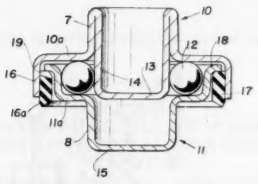
Horst Ernst, Eltingshausen; Armin Olschewski, Schweinfurt, and Manfred Brandenstein, Aschfeld, all of Germany, assignors to SKF Industrial Trading and Development Company B.V., Amsterdam, Netherlands

Filed July 26, 1973, Ser. No. 382,832

Claims priority, application Germany, Aug. 5, 1972, 7229170

Int. Cl. E05d *11/04*

U.S. Cl. 16—136 **9 Claims**



1. An axial and radial bearing for a swivel hinge comprising a pair of cup shaped bearing rings aligned in the same axial direction and a plurality of balls arranged therebetween, each of said bearing rings having an axially outwardly directed cylindrical portion concentric with the axis of the bearing and closed at one end forming a supporting lug said supporting lug being inserted in said hinge, said supporting lug having radially outwardly extending shoulders forming ball race surfaces, each of said shoulders terminating in an axially inwardly directed annular flange, the flange of one of said rings nesting within the other and means for securing the flange of one of the rings to that of the other of said rings.

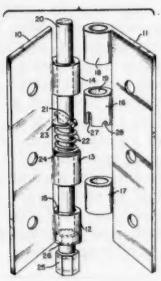
3,874,029
POSITIVE LOCKING HINGE

Richard C. McCullough, 1154 Eastwood Ave., Inglewood, Calif. 90304

Filed Jan. 16, 1974, Ser. No. 433,687

Int. Cl. E05d *11/10*

U.S. Cl. 16—144 **4 Claims**



1. A positive locking hinge including, in combination:

a. a first plate having a lower member defining a journalling bore at a lower portion of an edge of the plate;

b. a second plate having an upper member defining a journalling bore at a portion of its edge higher than said lower member so that when the edges of the plate are disposed in parallel adjacent relationship, the bores in the lower and upper members are axially aligned and vertically spaced apart;

c. a hinge shaft passing through the aligned bores and including a transverse pin extending radially from the shaft between the lower and upper members; and

d. spring means under said pin urging said shaft axially upwardly,

e. the lower end of said shaft and the lower portion of said lower member terminating in keying means such that upward movement of said shaft a first given distance when rotated to a given position locks the shaft against rotation to said lower member,

f. the lower edge of said upper member including a first notch of vertical depth greater than the radius of said pin for receiving said pin when said shaft is rotated to position the pin vertically under said first notch and then moved upwardly said first given distance to thereby lock said shaft to said upper member whereby said first and second plates are locked against swinging movement relative to each other,

g. the lower end of said upper member including a second notch of depth less than the depth of said first notch, whereby said shaft may be lowered said given distance and rotated to position said pin vertically under said second notch and thence moved upwardly into said second notch, said latter upward movement being sufficiently less than said given distance to prevent engagement of said keying means so that said shaft is no longer rotatably locked to said lower member and said plates can swing freely relative to each other.

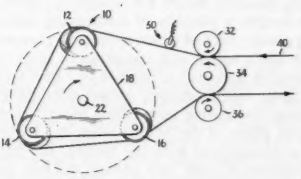
3,874,030
APPARATUS FOR SPREADING TOWS OF FIBROUS MATERIALS

Jack B. Knight, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Mar. 8, 1973, Ser. No. 339,167

Int. Cl. D01d *11/02*

U.S. Cl. 19—65T **7 Claims**



1. In apparatus for spreading the fibers of a web of spreadable material which includes an assembly of a plurality of curved rolls each having a smooth concave peripheral surface portion and a smooth convex peripheral surface portion over which said web can be advanced to effect successive incremental lateral separation of the web on each of said curved rolls,

mounting structure for supporting said curved rolls for rotation in planetary disposition about a fixed axis and for rotation of each about an axis defined by aligned mounting centers disposed parallel with the axes of the others and parallel with said fixed axis,

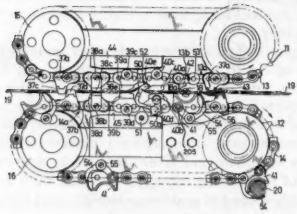
means for feeding said web in an open loop travel course around and in contact with first the concave peripheral surface portion and then the convex peripheral surface portion of each of said curved rolls, and

means for rotating said mounting structure about said fixed axis in a direction counter to the travel course of said web at a predetermined speed whereby said curved rolls transit an orbiting course about said fixed axis and a given point on the web contacts the convex peripheral portion of said curved rolls a plurality of times in excess of the plural number of rolls in said assembly.

3,874,031
APPARATUS FOR THE MANUFACTURE OF ROLLS FROM BATTING

Stefan Simon, Modling/Niederosterreich, Austria, assignor to Carl Hahn GmbH, Dusseldorf, Germany

Filed July 10, 1972, Ser. No. 270,393
Claims priority, application Germany, July 13, 1971, 2134921
Int. Cl. A61l *15/00*
U.S. Cl. 19—144.5 11 Claims

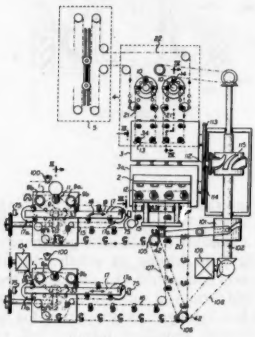


1. In an apparatus for the automatic feed, separation and winding of a specific length of a fibrous batting for tampons and the like, comprising a rotatable winding mandrel, means for rotating said mandrel when it contains batting to form a wound roll, means for axially displacing said winding mandrel transversely of the direction of support of a delivered batting in the plane of transport of said batting, means for transporting said batting perpendicular to the transverse movement of said winding mandrel, means for separating pieces of batting of specific length, a plurality of confronting cam-controlled processing groups, each of which processing groups comprises a batting holding means and comprises at least one pair of batting clamping jaws each controlled by a cam for the pieces of said batting, said processing groups containing a cutting means, means for moving said cutting means transversely of the transport plane of the batting when the batting holding means is in engagement with the batting, the improvement which comprises at least two endless flexible members in facing relationship with one another, means for driving said flexible members synchronously stepwise in a common plane of circulation, one clockwise and the other counter clockwise, such as to form at least one working station in the region between said flexible members, said working station having a winding cap laterally disposed in said working station coaxially of said winding mandrel, means for moving said winding mandrel into said winding cup of said working station disposed between said flexible members, means for disposing a portion of one of said flexible members over a portion of the other flexible member to define said working station, said working station having a group of processing parts from each of said flexible members and comprising a pair of tension jaws, means for engaging said batting by said jaws, means for transferring a wound roll from said winding mandrel into said winding cup, means for engaging and holding said batting by said batting clamping jaws, said winding cup disposed between said tension jaws and said batting clamping jaws, said cutting means comprising a cutting lever pivotally mounted at said clamping jaws of one of the two flexible members, means for moving said cutting lever transversely to said batting, the length of each group of processing parts in the direction of circulation with respect to said flexible members corresponding to the length of the piece of batting to be pulled off and wound.

3,874,032
METHOD AND APPARATUS FOR THE MANUFACTURE OF TAMPONS

Stefan Simon, Moedling/Niederoesterreich, Austria, and Wolfgang Johst, Gevelsberg, Germany, assignors to Dr. Carl Hahn GmbH, Dusseldorf, Germany

Filed July 12, 1972, Ser. No. 270,978
Claims priority, application Germany, July 15, 1972, 2135495
Int. Cl. A61l *15/00*
U.S. Cl. 19—144.5 24 Claims



1. In a process for the manufacture of tampons wherein a band of batting is wound into a plurality of rolls; the rolls are transferred to a pressing process wherein they are pressed into tampons and the tampons are transferred into storage or packaging, the improvement which comprises intermittently feeding a plurality of rolls along a first path to a continuously moving first transfer means, intermittently feeding a plurality of rolls along a second path to a continuously moving second transfer means, intermittently removing said rolls from said first transfer means and feeding them along a third path to a pressing apparatus, intermittently removing said rolls from said second transfer means and feeding them along a fourth path to said pressing apparatus, intermittently removing a plurality of the rolls from said pressing apparatus and feeding them along a fifth path to a third transfer means, and intermittently removing additional rolls from said pressing apparatus and feeding them along a sixth path to a fourth transfer means, the feed to said first transfer means, the removal therefrom and feed to said pressing apparatus and the removal therefrom and feed to said third transfer apparatus being synchronous with the feed to said second transfer means, the removal therefrom and the feed from said second transfer means to said pressing apparatus and the removal therefrom and the feed to said fourth transfer apparatus.

3,874,033
TRUMPET

Raymond E. Duncan, Union, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.

Filed Nov. 2, 1970, Ser. No. 85,927
Int. Cl. D01h *5/72*
U.S. Cl. 19—288 1 Claim

1. A roving guide for a spinning frame comprising: a generally triangular shaped flat body member molded from a friction resistant plastic like material having an opening therethrough, said opening being formed by two side walls which

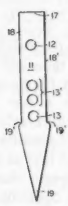
diverge from the apex of said body member and a third wall interconnecting said diverging walls and having a portion

thereof bowing upwardly toward the apex of said body member.

3,874,034
PERFORATED THERMOPLASTIC PLASTIC STRAP CLOSURE AFFIXED TO AN OPEN MOUTH BAG STRUCTURE

William J. Clayton, Fairport, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 216,411, Jan. 10, 1972, abandoned, Continuation-in-part of Ser. No. 35,779, May 8, 1970, Pat. No. 3,633,247. This application Feb. 7, 1974, Ser. No. 440,421
Int. Cl. B32b *3/02*; B65d *63/00*
U.S. Cl. 24—30.5 P **1 Claim**



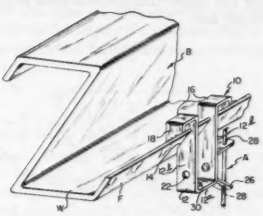
1. A device for closure of flexible bag structures which comprises a flexible elongated strap having at least two longitudinally spaced-apart perforations, one end of said strap being elongatedly tapered such that said tapered end may be inserted into and pulled through one of said perforations spaced-apart from another of said perforations said latter perforation being intermediate said tapered end portion (being inserted) and said perforation through which said end portion is inserted to form a noose, said elongatedly tapered strap end being further characterized by having outwardly projecting shoulders at opposite edges of said strap, approximately at the point where said flexible strap begins to taper, whereby when said noose is formed and said elongatedly tapered end is pulled through said perforation at said end portion of said strap, said intermediate perforation engages with the perforation through which said end portion is inserted to provide for said noose, a lock which is further reinforced by engagement of said shoulders with the engaged perforations.

3,874,035
HANGER CLIP

Jerome T. Schuplin, Parma Heights, Ohio, assignor to Fastway Fasteners, Inc., Lorain, Ohio

Filed June 26, 1974, Ser. No. 483,225
Int. Cl. A44b *13/00*
U.S. Cl. 24—84 H **20 Claims**

1. In a hanger clip adapted for mounting on a flanged beam or the like comprising, a body having means on said body for receiving in slip-fit relation the flange of the beam for supporting said clip in generally depending relation therefrom, means coacting with the first mentioned means adapted for gripping the beam flange and resisting withdrawal movement of the clip

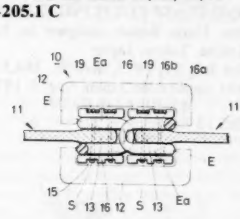


from the beam flange, and other means on said body for attaching thereto article supportive means.

3,874,036
SLIDING CLASP FASTENERS

Kiichi Yoshikawa, Toyonaka Osaka, Japan, assignor to Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 18, 1972, Ser. No. 281,724
Claims priority, application Japan, Aug. 20, 1971, 46-75197
Int. Cl. A44b *19/12*, *19/40*
U.S. Cl. 24—205.1 C **3 Claims**



1. In a sliding clasp fastener having a pair of opposed stringer tapes and rows of coupling elements mounted on the respective longitudinal edges of said tapes, the improvement which comprises a plurality of pairs of warp-knitted fabric strips having alternate wales of warp stitches and weft thread laid in coursewise to connect said wales forming grooves between adjacent wales, said pairs of fabric strips being each positioned to protectively cover a corresponding row of coupling elements along opposite areas thereof oriented to face the sliding clasp, and sewing stitches securing together the fabric strips associated with each stringer tape and the row of coupling elements mounted thereon, said sewing stitches being received and protectively recessed within said grooves out of wiping contact with the sliding clasp.

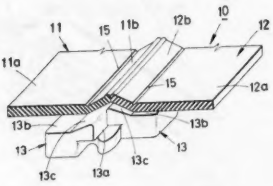
3,874,037
PRESSURE SEALING SLIDE FASTENER

Ikuo Takamatsu, Uozu, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

Filed Feb. 4, 1974, Ser. No. 439,057
Claims priority, application Japan, Feb. 6, 1973, 48-16118
Int. Cl. A44b *19/32*
U.S. Cl. 24—205.1 R **5 Claims**

1. A pressure-sealing slide fastener comprising:
a. a pair of opposed stringer tapes each including
1. a web portion and
2. a marginal edge portion connected thereto and extending at an angle therefrom beyond the center axis of the fastener in its free state;
b. a series of interlocking fastener elements each including
1. an engaging portion;

2. a flat mounting portion bonded to said web portion, and
3. a sloping portion contiguous to said flat mounting portion and supporting said marginal edge portion in its free state; and



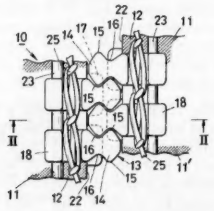
c. said marginal edge portions being engageable edgewise with each other and tiltable away from the sloping portion of said elements to increase the angle away from the plane of said tapes as said elements are interlocked.

3,874,038

SLIDING CLASP COUPLING ELEMENTS

Ikuo Takamatsu, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 31, 1973, Ser. No. 384,176
Claims priority, application Japan, Aug. 3, 1972, 47-91399
Int. Cl. A44b *19/04*
U.S. Cl. 24—205.13 R **8 Claims**



1. A sliding clasp fastener comprising, a pair of opposed stringer tapes, and a plurality of coupling elements disposed along and secured to a pair of adjacent longitudinal edge portions of said stringer tapes on corresponding upper surfaces of said tapes, wherein each of said coupling elements comprises;

an upper coupling member having an upper surface;

a lower coupling member underlying said upper coupling member and having a lower surface, said upper surface and said lower surface defining a thickness of said coupling element; and

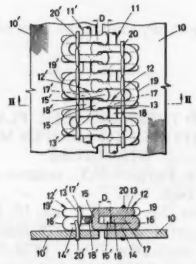
a leg portion integral with said upper coupling member and said lower coupling member and extending therefrom, said leg portion having an upper surface even with said upper surface of said upper coupling member, and a lower surface, said leg portion having a thickness substantially equal to said upper coupling member thickness, said lower coupling member terminating at a rear edge portion, said rear edge portion together with said lower surface of said leg portion defining an indentation having a depth approximately equal to a thickness of said stringer tapes and comprising a surface contacting the upper surface of one of said tapes and said edge portion contacting a longitudinal edge of said one of said tapes.

3,874,039

SLIDE FASTENER STRINGER WITH SCOOPS FABRICATED OF A CONTINUOUS FILAMENT

Ikuo Takamatsu, Oaza Daikaiji Uozu, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

Filed July 26, 1974, Ser. No. 492,061
Claims priority, application Japan, Aug. 24, 1973, 48-99845
Int. Cl. A44b *19/12*
U.S. Cl. 24—205.13 C **1 Claim**



1. In a pair of stringers for a slide fastener, wherein each of said stringers includes a tape and a continuous filament anchored to said tape, said filament being shaped in a zigzag configuration to provide a row of substantially U-shaped scoops which extend transversely of said tape and each of which consists of a pair of parallel spaced legs and a coupling head interconnecting said legs at the front end of the scoop, one of said legs being longer than the other leg and being folded over toward said coupling head to provide a folded portion which is sandwiched between said legs in registered relationship thereto, the improvement comprising a series of front connecting portions each interconnecting the front ends of said folded portions of two adjoining scoops on each tape, said front connecting portions being so positioned relative to the scoops on each tape that when the scoops on both tapes intermesh, the coupling head of every other scoop on each tape will abut on the corresponding front connecting portion on the other tape, whereby the meshing depth of said scoops on both tapes is determined by the position of said front connecting portion relative to said scoops.

3,874,040

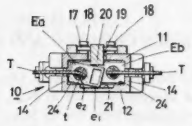
CAM-LOCK SLIDER

Shoetsu Murakami, Kurobe, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 15, 1973, Ser. No. 406,581
Claims priority, application Japan, Oct. 19, 1972, 47-121014[U]
Int. Cl. A44b *19/30*
U.S. Cl. 24—205.14 R **1 Claim**

1. In a cam-lock slider for a slide fastener wherein the slider has a top wing, a bottom wing, a neck portion interposed between and connecting the top and bottom wings at one end thereof, said wings each having a pair of angularly turned flanges on each side thereof which together with said neck portion define a Y-shaped guide channel within the slider to provide the passage of two rows of fastener elements each having a coupling head portion, a pull tab pivotally connected to said top wing, and a cam projecting from and integral with said pull tab, the improvement which comprises said bottom wing being provided with a shallow recess therein longitudi-

nally extending from a point adjacent said neck portion to the free end of the slider opposite said end at which the top and bottom wings are connected together, said recess extending transversely between bifurcated surfaces elevated with respect thereto each being provided between the recess and one of the side flanges and the other respectively for guiding the fastener

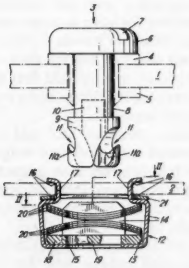


elements slidably thereon, and said cam being adapted to take an operative position in which it depresses only the coupling portion of one of the fastener elements in one of the two rows into locking engagement with said recess whereby said one of the fastener elements is held in partly or half coupled relation to a mating element in the opposite row.

3,874,041
FASTENERS

Howard J. L. Smith, Farnham, England, assignor to Dzus Fastener Co. Inc., West Islip, N.Y.

Continuation of Ser. No. 372,325, June 21, 1973,. This application Apr. 26, 1974, Ser. No. 464,477
Claims priority, application United Kingdom, June 13, 1972, 27646/72
Int. Cl. A44b *17/00*
U.S. Cl. 24—221 R **6 Claims**



1. A fastener receptacle for mounting in an aperture in a first part for releasably attaching the first part to a second part by means of a spiral cam fastener stud rotatably mounted in the second part, said fastener receptacle comprising:

a housing made of resilient sheet metal formed with side panels extending downwardly along the sides of the housing and disposed around a central spring chamber with an end opening to receive the end of the fastener stud;

two opposite side panels extending downwardly beyond the other side panels and formed at their ends with spring flanges for engaging the opposite sides of the aperture in the first part to secure the receptacle to said first part;

receiving means in the housing including a retaining bar extending transversely across the center of the receptacle housing for releasable engagement with the spiral cam of the stud;

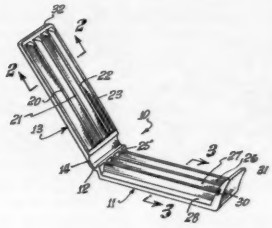
retention means to prevent rotation of the receiving means with respect to the housing while retaining the receiving means inside the walls of the housing and permitting the receiving means to shift axially inside the walls of the housing and thereby follow the spiral cam surface in the stud when relative rotation occurs therebetween; and

a spring positioned inside the housing between the receiving means and the base of the housing and engaging the receiving means for urging the retaining bar in a direction away from the spring flanges and toward the opposite end of the housing.

3,874,042
CLAMP FOR THIN WALLED TUBING

Roy T. Eddleman, Beverly Hills; Richard L. Schmitz, Palos Verdes, and David A. Sharbaugh, Redondo Beach, all of Calif., assignors to Biospectrum, Inc., Los Angeles, Calif.

Filed Jan. 22, 1973, Ser. No. 325,394
Int. Cl. F16k *7/04*; **A61b** *17/10*
U.S. Cl. 24—255 SL **5 Claims**



1. A method for sealing a thin walled, flexible tube, said method comprising closing said tube between intermeshed grooves and ridges located between an elongated base member having at least two spaced, longitudinal ridges positioned thereon, said base member being connected to an elongated mating member by hinge means attached to one end of said mating member and one end of said base member thereby interconnecting said mating member and said base member, said hinge means being integrally formed from the same material of construction used to form said base member and said mating member and having a non uniform thickness which is positioned so that upon closing, the thinner portion of said hinge means deflects the thicker portion of said hinge means; the mating member further having at least two spaced, longitudinal grooves having about the same shape as the ridges on said base member and positioned so that when said mating member and said base member are moved to a closed position said ridges and said grooves are brought into close and intermeshed proximity, said base member and said mating member having closing means for holding said members in a closed position, said closing means comprising an integral tongue with a notch formed therein attached to one of said mating members, said tongue being located at an end opposite from said hinge means and said notch being shaped to hold the end of the other of said mating members.

3,874,043
APPARATUS FOR UNCURLING THE EDGES OF A RUNNING WEB

William J. Holm, Springfield, Vt., assignor to Riggs & Lombard, Inc., Lowell, Mass.

Filed Oct. 9, 1973, Ser. No. 404,308
Int. Cl. D06c *3/00*
U.S. Cl. 26—68 **3 Claims**

1. Apparatus for uncurling and drying the edges of a running web, comprising

a. walls defining a substantially closed housing containing a hot gaseous atmosphere therein,

b. a conveyor belt having a flat horizontal upper reach disposed in said housing for conveying said web through

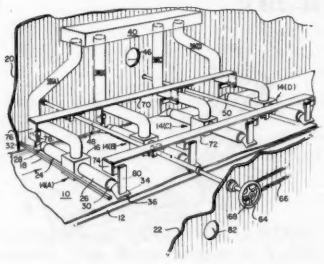
said housing in a flat and substantially tensionless condition,

c. a plurality of fixed, rigid tubes mounted to said housing and extending in spaced parallel relation, transversely above the upper reach of said belt and said web,

d. a tubular nozzle telescopically connected to each end of each of said fixed tubes and terminating in a downwardly and outwardly directed restricted slot opening oriented parallel to the edge of said web,

e. at least one lead screw having oppositely threaded portions mounted to opposite side walls of said housing with at least one end extending through one of said walls, said lead screw being parallel to said tubes,

f. a pair of followers mounted in spaced relation to each lead screw and threaded one to each threaded portion,



g. a bracket mounted to each follower and movable therewith,

h. all of said nozzles adjacent one side of said web connected to the same bracket and follower whereby rotation of said lead screw will move all of said nozzles along one side of said web in the same transverse direction and all of said nozzles along the other side of said web in the opposite direction,

i. conduit means connected to each of said fixed tubes, and,

j. blower means connected to said conduit means,

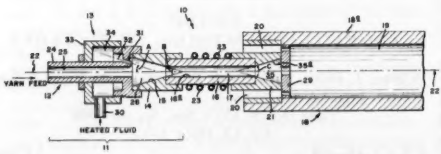
k. the intake of said blower means communicating with the interior of said housing whereby the heated gaseous atmosphere is recirculated from said housing through said nozzles to uncurl and dry the edges of said web.

3,874,044

APPARATUS AND PROCESS FOR SIMULTANEOUS CRIMPING AND COMMINGLING OF YARNS

Young D. Kwon, Morristown; Russell H. Butler, Dover; Hendrikus J. Oswald, Morristown, all of N.J., and Dong W. Kim, Chester, Va., assignors to Allied Chemical Corporation, New York, N.Y.

Filed Mar. 8, 1974, Ser. No. 449,409
Int. Cl. Do2g *1/20*
U.S. Cl. 28—1.3 **11 Claims**



7. An apparatus for simultaneous crimping and commingling continuous filament yarn, which comprises:

a. a contact chamber assembly including a contact chamber, yarn inlet means for feeding yarn into said contact chamber and fluid supply means for introducing heated fluid into said contact chamber substantially along an axis which forms an angle of not greater than about 85° with the axis of yarn passage through said contact chamber;

b. an energy tube wherein the yarn absorbs heat from said heated fluid, said energy tube communicating with said contact chamber; and

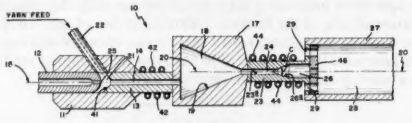
c. a stuffer tube assembly including a stuffer tube for texturizing said yarn and a stuffer receiver, said stuffer tube and said stuffer receiver communicating successively with said energy tube.

3,874,045

SIMULTANEOUSLY CRIMPING AND COMMINGLING YARNS

Russell H. Butler, Dover; Hendrikus J. Oswald, and Young D. Kwon, both of Morristown, all of N.J., assignors to Allied Chemical Corporation, New York, N.Y.

Filed Mar. 8, 1974, Ser. No. 449,427
Int. Cl. D02g *1/20*
U.S. Cl. 28—1.3 **8 Claims**



5. An apparatus for simultaneously crimping and commingling yarn which comprises:

a. a fluid contact chamber;

b. yarn feed means for feeding yarn into said fluid contact chamber;

c. heated fluid supply means for introducing heated fluid to said fluid contact chamber substantially along the longitudinal axis of said chamber;

d. a first energy tube wherein said yarn absorbs heat from said heated fluid, said first energy tube being positioned about a longitudinal axis and communicating with said contact chamber for yarn passage therethrough;

e. an expansion chamber having a cross-sectional area at its interface with said first energy tube which is larger than the cross-sectional area of said first energy tube;

f. a second energy tube wherein said yarn absorbs additional heat from said heated fluid;

g. said expansion chamber and said second energy tube being positioned such that said longitudinal axis of said first energy tube intersects an impacting surface;

h. said chamber communicating successively with said first energy tube and said second energy tube for yarn passage therethrough; and

i. a stuffer tube for texturizing said yarn communicating with said second energy tube for yarn passage therethrough.

3,874,046

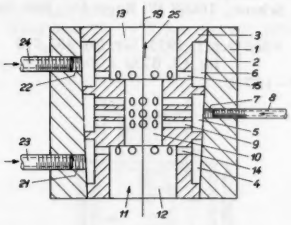
DEVICE FOR SINGEING THREADS

Paul Aschwanden, Arth, and Konrad Wick, Goldau, both of Switzerland, assignors to Aktiengesellschaft Fr. Mettler's Sohne Maschinenfabrik, Arth, Switzerland

Filed Apr. 24, 1973, Ser. No. 354,081
Int. Cl. D02j *3/16*
U.S. Cl. 28—63 **6 Claims**

1. A device for singeing threads comprising an outer cylindrical housing, a tubular insert arranged within said housing and having a bore therethrough defining a thread passage with a central narrow diameter portion and a widened end portion at each end, said tubular insert having an exterior wall with an intermediate annular groove defining a communication passage for a combustible fuel with said cylindrical housing, a plurality of radially extending passages extending from said communicating chamber to the interior of said bore and defining burner nozzles which are oriented around the thread pas-

sage for directing small combustion flames toward said thread passing therethrough, a combustion fuel supply pipe connected into said communicating passage through the wall of cylindrical housing, said insert and said housing defining at least one annular treatment fluid communication chamber



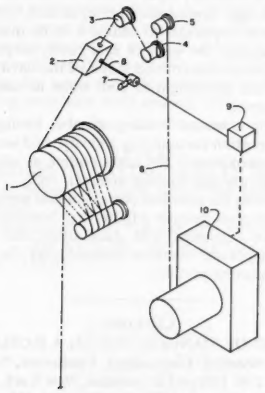
therebetween having a plurality of radially extending passages extending from said treatment chamber into said passage at a location adjacent said burners, and means for supplying a treatment fluid to said at least one treatment fluid communications chamber.

3,874,047

PROCESS TO PROVIDE NARROW YARN WIDTH OF TRANSFER TAILS OF MULTIFILAMENT YARN

Frank Lee Peckinpaugh, Colonial Heights, and Joseph John Bellemore, Chester, both of Va., assignors to Allied Chemical Corporation, Morristown, N.J.

Filed Nov. 21, 1972, Ser. No. 308,360
Int. Cl. D02g *1/16*
U.S. Cl. 28—72.12 **5 Claims**



1. In a method of winding uncommingled, multifilament yarn onto a package to form a transfer tail at the beginning of a package, the improvement comprising

providing jet means to commingle said yarn prior to said winder, and

commingling said yarn during formation of said transfer tail by actuating said commingling means only during tail formation,

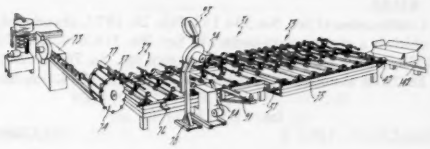
whereby said tails have narrow yarn width without splaying.

3,874,048

METHOD AND APPARATUS FOR FABRICATING TUBING

Barry C. Millar, Islington, and Keith W. Little, Georgetown, both of Ontario, Canada, assignors to Bundy Corporation, Detroit, Mich.

Filed Dec. 4, 1972, Ser. No. 311,952
Int. Cl. B23p *23/00*
U.S. Cl. 29—33 K **30 Claims**



1. A tube fabricating apparatus comprising:

a. a plurality of work stations each having

i. an independently operable work performing mechanism, and

ii. tube clamping means operable to support a tube during the performance of work thereon,

b. transfer means for successively advancing tubes between work stations,

said transfer means including a plurality of grab clamps operable to support tubes during their movement to or from a work station;

c. means for preventing the disengagement of said grab clamps from the tubes gripped thereby until after the tubes have been secured by the clamping means of a work station to which they are delivered, and

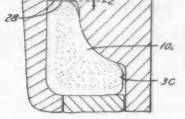
d. power operated means for opening and closing said tube clamping means with tubes supported in stationary positions therein by said grab clamps.

3,874,049

METHOD OF MAKING A POWDERED METAL PART HAVING A BEARING SURFACE

Howard A. Ferguson, Coldwater, Mich., assignor to Russell, Burdsall & Ward, Inc., Greenwich, Conn.

Filed Apr. 13, 1973, Ser. No. 350,939
Int. Cl. B21d *53/10*; B22f *3/24*
U.S. Cl. 29—149.5 DP **5 Claims**



1. The method of forming a highly densified metal part having a high density bearing surface thereon, comprising:

a. compacting a quantity of powdered metal into a preform;

b. sintering the preform;

c. cooling the preform;

d. at room temperature in a die shaping the preform to the desired configuration of the metal part including subjecting the preform to both tensile and shear stresses, commencing at the intended bearing surface and progressing substantially throughout the remainder of the preform, of sufficient magnitude to substantially elongate the grain and pore structure of the preform; and

e. subjecting the preform to compressive stresses at the intended bearing surface and thereafter at the other surfaces as the tensile shear stresses approach the point of

fracture of the preform, such compressive forces being of sufficient magnitude to prevent fracture of the preform and cause collapse of the elongated pores and welding of the grains across the collapsed pore boundaries throughout the powdered metal part.

3,874,050

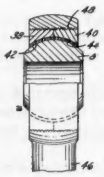
METHOD OF MAKING A BEARING

Charles S. White, 35815-42nd St., East, Palmdale, Calif. 93550

Continuation of Ser. No. 334,192, Feb. 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 316,844, Dec. 20, 1972, , which is a continuation-in-part of Ser. No. 76,110, Sept. 28, 1970, abandoned. This application Apr. 4, 1974, Ser. No. 457,860

Int. Cl. B23p *11/00*

U.S. Cl. 29—149.5 B **15 Claims**



1. The method of making a bearing comprising:

winding on the exterior bearing surface of an inner bearing member through a plurality of juxtaposed helical turns a continuous strand of bondable low friction thread impregnated with a bonding resin,

treating said windings to form a low friction bearing layer including compacting the thread turns together and into close conformity with the bearing surface of the inner bearing member and fusing together the resin of adjacent turns to bond the thread turns together in a continuous matrix,

and constructing an outer member about the bearing layer in locked engagement therewith to form an outer relatively movable bearing member around the inner bearing member.

3,874,051

METHOD FOR PRODUCING GIRDERS

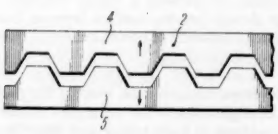
Stanislaus Malik, Taelesbahnstrasse 24, 734 Geislingen, Germany

Filed Jan. 25, 1974, Ser. No. 436,725

Claims priority, application Germany, Jan. 25, 1973, 2303466

Int. Cl. B23p *17/00;* **B21d** *39/02*

U.S. Cl. 29—155 R **7 Claims**



1. A method for producing open-web girders which comprises joining first and second continuous bands of flat stock material having an undulating pattern along one edge thereof such that the high points of said first band join the corresponding high points of said second band and the low points of said first and second bands cooperate to form openings in the resulting planar web, and forming said planar web into a profile of a structural girder.

3,874,052

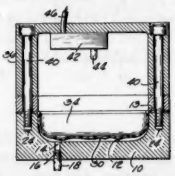
METHOD OF FORMING AND INSTALLING PRESSURE RESPONSIVE DIAPHRAGMS

Spencer C. Schantz, 16608 W. Roger Dr., New Berlin, Wis. 53153

Filed Oct. 1, 1973, Ser. No. 402,519

Int. Cl. B23p *15/00*

U.S. Cl. 29—157 R **12 Claims**



1. In a method of manufacturing a pressure responsive device which includes a shaped actuating diaphragm of thin material, the steps of:

a. fabricating a housing member for the pressure responsive device with a cavity of predetermined contour in accordance with a desired diaphragm shape for the pressure responsive device and with a marginal portion surrounding said cavity;

b. providing a duct in said housing member communicating with said cavity;

c. covering said cavity with a diaphragm formed of a flat sheet of thin thermoplastic material;

d. clamping a marginal portion of said diaphragm over said marginal portion of said housing around said cavity;

e. applying a relatively light vacuum to said duct to draw said diaphragm toward the bottom of said cavity;

f. heating said diaphragm to enable it to be drawn by said vacuum against the walls of said cavity to permanently assume said predetermined shape of the cavity;

g. allowing the diaphragm to cool while in said predetermined shape;

h. fabricating a second housing member having a second marginal portion surrounding a cavity, said second cavity having approximately the same outline as said cavity of the first-mentioned housing member; and

i. then clamping the marginal portion of said second housing to the marginal portion of the first housing, with said cavities in alignment with each other and while the shaped diaphragm remains clamped over the margin of the first housing portion.

3,874,053

METHOD OF MANUFACTURING A RADIATOR

Anton Marie Nederlof, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 9, 1973, Ser. No. 404,358

Claims priority, application Netherlands, Oct. 18, 1972, 7214059

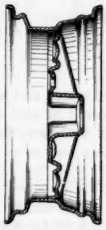
Int. Cl. B21d *53/02;* **B23p** *15/26*

U.S. Cl. 29—157.3 B **5 Claims**

1. In a method of manufacturing a radiator, the steps comprising folding a metal strip into a stack of zig-zag folds, each fold comprising a fin part extending transversely across the stack and a side part extending generally lengthwise of the stack, with said stack comprising a series of adjacent fin parts traversing the stack and a series of adjacent side parts along the sides of the stack, compressing said folds such that adja-

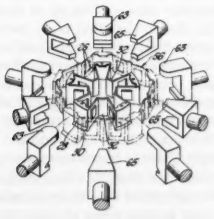
cent side parts are urged into contact, thus forming a continuous wall, and soldering a pipe to said wall of side parts on each side of said stack.

3,874,054
"WHEEL PROCESS"
Merlyn R. Reppert, Torrance, Calif., assignor to W. R. Grace & Co., New York, N.Y.
Filed Nov. 29, 1973, Ser. No. 420,109
Int. Cl. B21h *1/02;* **B21k** *1/32*
U.S. Cl. 29—159.01 **5 Claims**



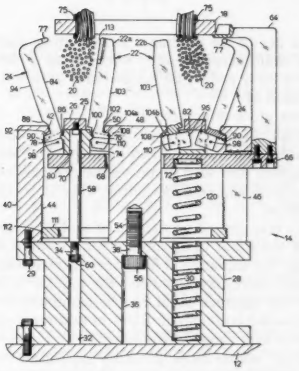
1. In the method comprising forming an automobile wheel center comprising stamping out a blank from stock, drawing same, forming spoke ridges, and stamping lug and hub holes, the improvement comprising:
1. as a first step, prepolishing the stock;
2. in the drawing step, forming a deep draw with the depth of the draw being about one-quarter the diameter of the resulting blank;
3. forming alternate spoke and lug pocket areas, the lug pocket areas being approximately in the same plane as the periphery of the blank;
4. further forming the lug pockets to depress same below the plane of the peripheral plane of the blank while simultaneously reducing the height of the hub area;
5. in a subsequent forming step, still further depressing the lug pockets below the plane of the periphery, and still further reducing the height of the hub area;
6. forming lug bosses and stamping out the hub center;
7. piercing peripheral slots and lug holes.

3,874,055
METHOD OF MAKING VEHICLE WHEEL
Raymond J. Wilcox, 44 Via Casitas, San Luis Rey Downs, Calif. 92068
Filed Feb. 22, 1974, Ser. No. 446,199
Int. Cl. B21h *1/02;* **B21k** *1/32*
U.S. Cl. 29—159.01 **8 Claims**



1. A method for fabricating vehicle wheels comprising:
forming a plurality of spaced rim retaining flanges in an elongated section of sheet steel;
coiling said elongated section of sheet steel into a single closed loop;
deforming said single closed loop at predetermined circumferentially spaced points to produce a plurality of circumferentially spaced radial vanes extending from an inner diameter to said rim retaining flanges at an outer diameter; and
attaching said deformed single closed loop to a hub fitted into said inner diameter.

3,874,056
STATOR COIL PRESS
Robert W. Peters, 9036 N. 75th St., Milwaukee, Wis. 53233
Filed Sept. 27, 1973, Ser. No. 401,240
Int. Cl. H02k *15/06, 15/085*
U.S. Cl. 29—205 D **11 Claims**



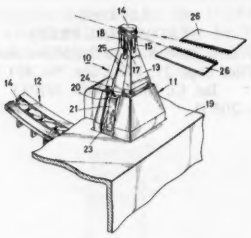
1. A stator coil former comprising: a frame, a pair of dies mounted on said frame in an opposing relation, means for moving said dies toward each other to an operative position and away from each other to an inoperative position, each die including a base, means mounted on each of said bases for supporting a stator between said dies, said supporting means being movable relative to said base on movement of said dies between operative and inoperative positions, means for biasing said supporting means to inoperative positions, a number of outer coil forming segments mounted on said supporting means for movement between operative and inoperative positions, a number of inner coil forming segments mounted on said supporting means for movement between operative and inoperative positions, said inner coil forming segments including means for staggering said inner segments when moved to the inoperative position, cam means mounted on said base for moving said segments to an operative position on movement of said supporting means relative to said base and to an inoperative position on movement of said supporting means to the inoperative position, and means secured to said base for compressing the stator coils confined in the space between said inner and outer segments on movement of said dies toward the operative position.

3,874,057

SLIDER HOLDER WITH A SELF-ACTUATED RELEASE MECHANISM

Koichi Kawakami, Kurobe, and Tatsuo Osaki, Uozu, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 17, 1974, Ser. No. 461,630
Claims priority, application Japan, Apr. 19, 1973, 48-44495
Int. Cl. B23p *19/04*
U.S. Cl. 29—207.5 SL 4 Claims



1. In a device for holding a slider during assemblage of a fastener chain therethrough, wherein the slider includes a channeled body and a pull tab pivotally attached thereto, the combination of:

a hollow guide structure;

an upright support structure slidably mounted in said guide structure for up-and-down motion therethrough, in such a manner that said support structure partly projects upwardly of said guide structure when in its most elevated position;

a slider rest formed on the top of said support structure to hold the slider in upside-down disposition thereon, said slider rest including at least one channel extending downwardly therefrom to receive the pull tab of the slider, so that the fastener chain can be manipulated through the channeled body of the slider in said most elevated position of said support structure;

a pair of release arms pivotally supported on said guide structure in opposed relationship to each other;

resilient means for biasing the free ends of said release arms toward each other so that said free ends of said release arms will yieldably abut against the opposite surfaces of said support structure when the same is in said most elevated position; and

whereby upon descent of said support structure into said guide structure, said free ends of said release arms slide along said support structure to engage the slider on said slider rest, the engaged slider being succeedingly released from said slider rest with the continued descent of said support structure to its most depressed position within said guide structure.

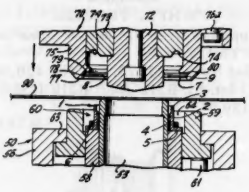
3,874,058

CLOSURE FORMING APPARATUS

John Jesevich, Cicero, and Vyto Simkus, Chicago, both of Ill., assignors to American Flange & Manufacturing Co., Inc., New York, N.Y.

Division of Ser. No. 131,258, April 5, 1971, Pat. No. 3,800,401. This application Oct. 25, 1973, Ser. No. 409,388
Int. Cl. B23p *19/04*
U.S. Cl. 29—208 D 3 Claims

1. Apparatus for simultaneously securing a closure flange and a tag ring element to a container wall in a single punch press operation comprising a lower die sub-assembly, means in said lower die sub-assembly for supporting a closure flange having an upstanding cylindrical neck with an unthreaded upper portion and an internally threaded lower portion surrounded by a polygonal base, an upper die sub-assembly operatively positioned above said lower die sub-assembly, means in said upper die sub-assembly for releasably retaining an annular tag ring element, and means for positioning a container wall between said upper and lower die sub-assemblies whereby downward closing of said upper die sub-assembly permanently secures said closure flange and said tag ring element about an opening formed in said container wall.

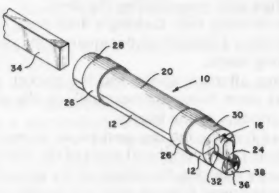


3,874,059

ROTARY ENGINE APEX SEAL AND SPRING INJECTOR

Thomas J. Kosmanski, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 17, 1974, Ser. No. 461,754
Int. Cl. B25b *27/14*
U.S. Cl. 29—235 3 Claims



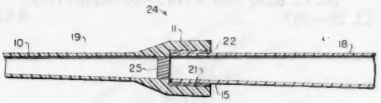
1. A rotary engine rotor apex seal injector apparatus for assembling multi-component apex seals in axial grooves formed at each apex of a triangularly shaped rotor planetating within a trochoidal engine cavity, the cavity being defined by spaced parallel housing end walls and a central inner peripheral wall defining the trochoid, the rotor including opposite side walls parallel to said end walls and containing arcuate gas seals each extending along a respective peripheral surface of said triangularly shaped rotor and engaging said end walls, said rotor side walls also including corner seal recesses at each juncture of said gas seals adjacent each end of said apex seal grooves; said apex seal injector comprising in combination: a first body member containing an axially extending slot; a second body member also containing an axially extending slot aligning with the slot in said first body member when placed thereon in an assembled mating relationship; said slots defining an axially extending chamber extending through the assembled first and second body members and having dimensions sufficient for closely receiving and slidably containing the components of said apex seal assembly; means for rigidly retaining said body members in assembled engagement, said means comprising a sleeve member telescopically fitting over said body members in a close fit relationship; and guide means extending from one end of said body members conforming to one of said corner seal recesses aligning the chamber in said body members and consequently said apex seal assembly with the seal groove in said rotor apex whereby said seal assembly is injected into said rotor groove by applying a force to one end of said seal assembly in said injector and extending the seal assembly outwardly into said rotor apex groove.

3,874,060

METHOD OF FABRICATING A DEMOUNTABLE ROD

Richard D. Barnes, Costa Mesa, Calif., assignor to The Conlon Corporation, Santa Ana, Calif.

Filed June 18, 1974, Ser. No. 480,381
Int. Cl. B23p 17/00
U.S. Cl. 29—416 4 Claims



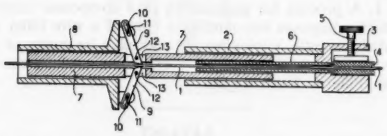
1. The method of fabricating a demountable rod comprising the steps of:
   a. forming a tapered fiberglass tube having a thickened central portion with an outwardly thickened wall;
   b. smoothing the taper of the larger end of the tube adjacent to the thickened central portion;
   c. cutting the tube in two adjacent to the thickened central portion forming a tapered butt portion and a tip portion having the thickened portion at the large end thereof;
   d. reaming an opening in the end of the thickened portion larger than the small end of the butt portion;
   e. placing a molding material in the opening;
   f. coating the smaller end of the butt portion with a mold release agent; and
   g. inserting the smaller end of the butt portion in the opening while the molding material hardens to form a demountable joint.

3,874,061

WIRE INSERTING DEVICE

Maurice Gauthier, Angouleme, France, assignor to COFPA-compagnie Des Feutres Pour Papeteries Et Des Tissus Industriels, Le Gond Pontouvre, France

Filed May 30, 1973, Ser. No. 365,326
Int. Cl. B23p 19/04
U.S. Cl. 29—241 3 Claims



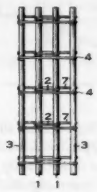
1. A device for inserting a thread-like element into a duct or the like, said device comprising:
   a clamping element for fixedly supporting the end of the duct within which said thread-like element is required to be inserted, said clamping element including a fixed thread guide tube positioned in axial alignment with said duct for receiving said thread-like element and feeding said thread-like element into said aligned duct, and
   multiple, symmetrical thread gripping and pushing means carried by said thread guide tube and engaging said thread-like element on opposite sides thereof, for exerting a thrust force on said thread-like element to move it axially first through said guide tube and secondly into said aligned duct.

3,874,062

PROCESS FOR FABRICATING A COLUMNAR ASSEMBLY OF SPACED REINFORCING BARS

Kiyoshi Muto, Tokyo; Yasuhisa Yamamoto, Kyoto; Yoshinori Toyoda; Shozo Azemi, both of Chiba; Shigeru Okano, Ichihara; Kenya Masuyama, Chiba; Seitaro Aihara, Tokyo; Takao Ito, Tokyo; Isamu Ogawa, Tokyo, and Mitsumasa Harada, Tokyo, all of Japan, assignors to Kajima Kensetsu Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 28, 1973, Ser. No. 392,373
Claims priority, application Japan, Mar. 16, 1973, 48-30607
Int. Cl. B23p 11/00
U.S. Cl. 29—428 21 Claims



1. A process for fabricating a columnar assembly of spaced reinforcing bars comprising the steps of:
   1. suspending two upper main reinforcing bars in horizontal, parallel, spaced relationship;
   2. attaching a first constraining hoop to said upper main reinforcing bars such that said upper main reinforcing bars are attached to said first constraining hoop along the upper portion of said first constraining hoop and said first constraining hoop hangs down from said upper main reinforcing bars;
   3. attaching two lower main reinforcing bars to said first constraining hoop along the lower portion thereof, said lower main reinforcing bars being in horizontal, spaced relationship and parallel to said upper main reinforcing bars;
   4. suspending two upper intermediate reinforcing bars between said upper main reinforcing bars in horizontal, spaced relationship to each other and parallel to said main reinforcing bars;
   5. attaching a second constraining hoop to said upper intermediate reinforcing bars such that said upper intermediate reinforcing bars are attached to said second constraining hoop along the upper portion of said second constraining hoop and said second constraining hoop hangs down from said upper intermediate reinforcing bars;
   6. attaching two lower intermediate reinforcing bars to said second constraining hoop along the lower portion thereof, in horizontal, spaced relationship to each other, and parallel to said upper main reinforcing bars; and
   7. attaching the assembly comprising said main reinforcing bars and said first constraining hoop to the assembly comprising said upper and lower intermediate reinforcing bars and said second constraining hoop.

3,874,063

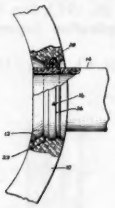
METHOD OF PIPE JOINT SEALING

Harry W. Skinner, 4609 St. Joe Center Rd., Fort Wayne, Ind. 46815, and Max D. Orn, Scotia, N.Y., assignors to said Skinner, by said Orn

Filed Nov. 11, 1971, Ser. No. 197,656
Int. Cl. B23p 11/02
U.S. Cl. 29—450 5 Claims

1. The method of first forming an opening with a sealing ring therein through the wall of a rigid concrete structure and thereafter sealing a pipe in said opening comprising the steps of mounting a sealing ring of rubber-like material on the outer periphery of a two-part axially-separable mounting plug, se-

curing said plug into sealing engagement with a structure-defining form, forming said structure with said opening in said wall and said sealing ring therein by applying a plastic mass of concrete to said form and into both encircling engagement with the outer periphery of said sealing ring and axial abutting engagement with radially outer portions of both ends of said sealing ring whereby said concrete will form said opening and



will secure said sealing ring therein, disassembling and removing said parts from the opposite sides of said wall for removing said mounting plug from said sealing ring and said wall after said concrete solidifies, inserting said pipe into said opening and into light engagement with said sealing ring, and elastically expanding the inner periphery of said sealing ring inwardly into sealing engagement with said pipe.

3,874,064

PROCESS FOR SECURING A RIGID COUPLING TO ONE END OF AN ARMORED FLEXIBLE PIPE

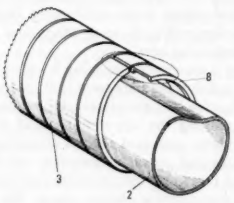
Andre Chevalier, Pantin, France, assignor to Institut Franc ais du Petrole, des Carburants et Lubrifiants, Rueil-Malmaison, France

Filed Nov. 8, 1973, Ser. No. 414,103

Claims priority, application France, Nov. 21, 1972, 72.41397

Int. Cl. B23p *3/00, 19/04*

U.S. Cl. 29—460 **2 Claims**



1. A process for securing a rigid coupling to the end of a flexible pipe which comprises at least one flexible tight tubular core, surrounded by an armouring formed by a helical winding with a short pitch of an elongated element around said core, this process comprising cutting the tubular core and the armouring at predetermined respective lengths so that their ends may be housed in corresponding respective housings in the coupling with positioning means for a continuous sealing of the tubular core at the level of the coupling, resiliently deforming said tubular core inwardly so as to locally provide a substantial spacing between said core and said armouring, cutting out said armouring, at the level where said tubular core is deformed, substantially along a cross-section of the elongated element, eliminating the local deformation of the tubular core and thereafter positioning said armouring and core in said corresponding housing of the coupling, said housing having the shape of a bore with an internal diameter which is substantially greater than the external diameter of said armouring, so as to provide a substantial annular space between the armouring, the core and the walls of said bore, and injecting into said bore a solidifiable material which substantially fills said annular space.

3,874,065

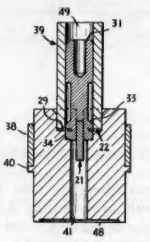
METHOD OF MAKING A STUD ASSEMBLY

Peter Schenk, West Islip, N.Y., assignor to Drus Fastener Co., Inc., West Islip, N.Y.

Filed Nov. 5, 1973, Ser. No. 412,707

Int. Cl. B23q *3/00;* **B21d** *39/00;* **B23p** *11/00*

U.S. Cl. 29—467 **8 Claims**



1. A method of producing a stud assembly comprising:
holding in fixed position a head portion having a gripping surface extending from a base;
extending a deformable washer over the base;
providing a stud member with a receptacle end portion and positioning the stud member with respect to the base of the head so that interengaging and cooperating surfaces on the receptacle and base are aligned and provide locking apertures for receiving the washer; and
deforming the washer so that it extends into the locking apertures thereby locking the stud member to the head and forming a unitary stud assembly.

3,874,066

PREPARATION OF COMPOUND WIRE

Christer Lanner, Garphyttan, Sweden, assignor to AB Garphytte Bruk, Garphyttan, Sweden

Filed Apr. 4, 1973, Ser. No. 347,626

Claims priority, application Sweden, Apr. 11, 1972, 4655/72

Int. Cl. B23k *21/00*

U.S. Cl. 29—470.1 **5 Claims**

1. A process for preparation of a compound metal wire which comprises surrounding a core of a wire billet with a tubular mantle, joining mantle and billet by means of explosive joining or cladding and working the resulting composite wire billet to finished wire.

3,874,067

METHOD AND APPARATUS OF BUTT WELDING PIPES OR THE LIKE

Terumasa Toyooka, and Kiyoshi Terai, both of Hyogo, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Hyogo, Japan

Filed June 7, 1973, Ser. No. 367,928

Int. Cl. B23k *19/00*

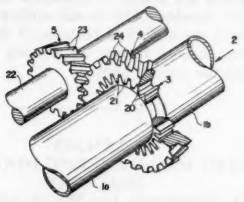
U.S. Cl. 29—470.3 **3 Claims**

1. A method of butt welding pipes comprising the steps of:
beveling the ends of the pipe to be butt welded to form opposed outwardly diverging surfaces,
inserting a metal ring of corresponding size and thickness and having correspondingly oppositely diverging end surfaces between said pipes and in end abutting position with respect to said pipes to be joined,
forcibly rotating the inserted ring about a common axis including the pipes and the ring while applying compres-

sive force between the pipes and the ring to elevate the temperatures of the ends of the pipes and the ring by the heat of friction,

terminating rotation of the ring, and

applying final compression between the pipes to butt weld said pipes by means of said ring, with said ring being provided with a cross section corresponding to that of the



diverging groove formed between the pipes when abutting;

whereby, fins resulting from welding do not form on the inner periphery of the welded pipe, and any fins formed by the wedge action of the beveled ends of the pipe acting on the insert ring are formed radially outward permitting subsequent removal from the exterior surface of the butt welded pipes.

3,874,068

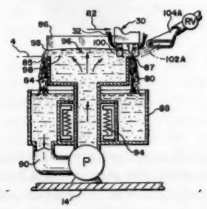
WAVE SOLDERING ELECTRICAL CONNECTIONS

Lawrence E. Cook, Meriden, Conn., assignor to Dynamics Corporation of America, New York, N.Y.

Division of Ser. No. 219,036, Jan. 19, 1972, Pat. No. 3,765,591, which is a continuation-in-part of Ser. No. 138,651, April 29, 1971,. This application Mar. 2, 1973, Ser. No. 337,386

Int. Cl. B23k *31/02*

U.S. Cl. 29—471.1 **11 Claims**



1. The method of mechanically soldering an electrical terminal connection carried by a workpiece comprising flowing a bed of heated molten solder over colevel spaced weirs and providing therebetween at a constant level in opposite directions from the center of an elongated laterally confined substantial area at a uniform level over colevel spaced weirs of restricted width at a predetermined depth,

progressively passing solder accepting terminals on a workpiece in a horizontal plane within said depth across one weir in an upstream direction into and through said center and downstream out of said molten solder across the other weir in said horizontal plane, and

directing a blast of air towards said other weir and the terminal connections as they progressively leave the molten solder across said other weir to scavenge back to the molten solder the excess molten solder thereon, and hardening the solder bond on the terminals while cooling the workpiece and the atmosphere above the molten solder around the workpiece.

3,874,069

METHOD OF BONDING SILICON CARBIDE BODY TO A METAL PART

Bryan Edward Ingleby, Preston, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Mar. 12, 1974, Ser. No. 450,293

Claims priority, application United Kingdom, Mar. 22, 1973, 13973/73

Int. Cl. B23k *31/02*

U.S. Cl. 29—473.1 **6 Claims**

1. A process for joining a metal part to a self-bonded silicon carbide body, the process comprising the steps of treating the silicon carbide body to remove free silicon from the surface of the body, electroplating the treated body with a metal and bonding the metal plating to a metal part.

3,874,070

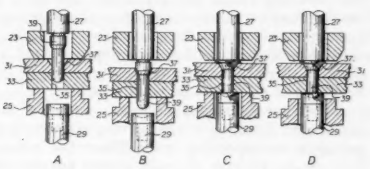
HIGH FATIGUE SQUEEZE RIVETING PROCESS AND APPARATUS THEREFOR

Joseph George Falcioni, Tacoma, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Aug. 3, 1973, Ser. No. 385,450

Int. Cl. B23p *19/00*

U.S. Cl. 29—526 **18 Claims**



1. A high fatigue squeeze riveting process for riveting items together, said items being clamped together by applying suitable opposing clamping forces, one on either side of said items, and including a hole passing through the items, said hole being located adjacent to said clamping forces, said high fatigue squeeze riveting process comprising the steps of:

pressing a rivet stud into said hole from one side thereof until said rivet stud reaches a predetermined depth of penetration in said hole;

removing one clamping force from said items as said rivet stud is pressed into said hole;

applying a force to said rivet stud directly opposite to said pressing direction so as to deform said rivet stud into a rivet; and,

decreasing the other clamping force applied to said items as said rivet stud deforms.

3,874,071

MACHINE TOOL WITH AUTOMATIC TOOL CHANGING DEVICE

Sadamu Kato, Takahama, Japan, assignor to Toyoda Koki Kabushiki Kaisha, Kariya-shi, Aichi-ken, Japan

Filed Feb. 23, 1973, Ser. No. 335,094

Claims priority, application Japan, Feb. 25, 1972, 47-19941

Int. Cl. B23q *3/157*

U.S. Cl. 29—568 **5 Claims**

1. A machine tool having an automatic tool changing device comprising:

a bed;

workpiece supporting means movably mounted upon said bed and moved by motor means;

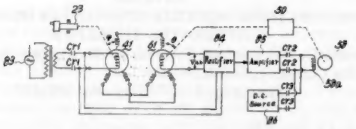
a column mounted upon said bed for slidably supporting spindle head means, said spindle head means rotatably

supporting a drive spindle having first engagement means including one of a key means and a recess means for driving a tool holder carrying cutting tool means mounted upon said drive spindle;

tool magazine means mounted upon said column for supporting a plurality of said tool holders securely holding said cutting tool means and means for indexing said magazine to position a preselected one of said tool holders and said cutting tool means thereon to a predetermined position when a tool changing operation is to be performed, said tool holders respectively having second engagement means including the other of said key means and recess means being engageable with said first engagement means upon said drive spindle;

arm means for removing and replacing said holder carrying said cutting tool means from said tool magazine;

primary arm means for exchanging said holder carrying said cutting tool means upon said arm means for said holder carrying said cutting tool means within said drive spindle;



first detecting means connected with said drive spindle for detecting a first angular position of said first engagement means upon said drive spindle;

second detecting means for detecting a second angular position of said second engagement means upon said tool holder while held upon said arm means;

first control means, responsive to the outputs of said first and second detecting means, serving to generate an output signal corresponding to the differential between said first angular position and said second angular position; and

second control means for rotating one of said drive spindle and said tool holder held by said arm means that is to be exchanged for a tool holder mounted on said drive spindle, responsive to said output signal of said first control means so as to prealign said first and second angular positions, whereby when said primary arm means interchanges said tool holder from said arm means to said spindle said first and second engagement means are coincident.

3,874,072

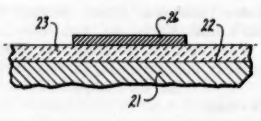
SEMICONDUCTOR STRUCTURE WITH BUMPS AND METHOD FOR MAKING THE SAME

Ralph E. Rose, San Jose, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Division of Ser. No. 238,116, March 27, 1972, Pat. No. 3,821,785. This application Aug. 27, 1973, Ser. No. 392,112

Int. Cl. B01j *17/00*

U.S. Cl. 29—578 **12 Claims**



1. In a method for forming a semiconductor structure, providing a semiconductor body having a planar surface and having metallic contact pads formed over said surface, forming a layer of insulating material overlying said contact pads and adherent to said contact pads, forming windows in said layer of insulating material overlying said contact pads to expose said contact pads, forming a relatively thick ductile layer of solely one metal on said insulating layer and extending through said windows to make contact with said contact pads, forming a metal layer on the thick ductile layer which will not react with the thick ductile layer and which will form a diffusion barrier so that the thick ductile layer will retain the characteristics of said one metal, forming metallic stand-offs on said metal layer and overlying said contact pads to provide surfaces which are spaced a substantial distance above the ductile layer, forming solder on said surface of said stand-offs, and removing the undesired portions of the ductile layer so that discrete spaced bumps are formed overlying and in contact with the contact pads.

3,874,073

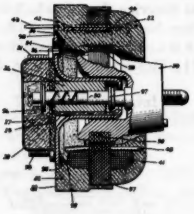
METHOD OF MANUFACTURING DYNAMOELECTRIC MACHINES

Richard W. Dochterman, Fort Wayne, Ind., and Michael E. Wendt, Tyler, Tex., assignors to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 215,751, Jan. 6, 1972, Pat. No. 3,758,799, which is a continuation-in-part of Ser. No. 6,666, Jan. 29, 1970, abandoned. This application July 11, 1973, Ser. No. 378,191

Int. Cl. H02k *15/02*

U.S. Cl. 29—598 **8 Claims**



1. A method of manufacturing a dynamoelectric machine having at least a rotatable member and a stationary composite structure comprising a winding support, at least one winding accommodated by the winding support, and a self-supporting primary structural member forming a housing for protecting at least part of the one winding, said method comprising: forming the self-supporting primary structural member as a substantially rigid, self-supporting, exterior housing member around at least part of the winding without an exterior peripheral casing therearound by placing at least the part of the one winding in a mold cavity, by packing within the mold cavity from about 65 to about 80 parts by weight of an interstitial mass of particulate material comprising at least about 50% by weight of from 40 to 100 mesh size particles around said part of the one winding and retaining from about 20 to about 35 parts by weight of an unhardened material in the interstices of the mass, and by hardening the unhardened material to form the primary structural member as a substantially rigid housing member around said part of the one winding; removing the housing member and part of the one winding from the mold cavity; and thereafter supporting the rotatable member for rotation relative to the composite structure.

3,874,074

METHOD OF FABRICATING A STABILIZED COMPOSITE SUPERCONDUCTOR

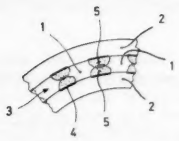
Gundolf Meyer, Birmenstorf, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed May 30, 1973, Ser. No. 365,148

Claims priority, application Switzerland, May 31, 1972, 8080/72

Int. Cl. H01v *11/14*

U.S. Cl. 29—599 17 Claims



1. In the method for producing electrical superconductors consisting of a great number of mutually spaced fine filaments of a superconductive material by diffusion of a material of a first layer into a material of a second adjacent layer, the improvements which comprise the steps of forming between said layers mutually spaced zones of a foreign substance extending in the direction of the to be formed superconductors and which function to prevent diffusion within said second layer at its zones or to at least greatly reduce the superconductive properties of the intermetallic compound formed at its zones by diffusing into said second layer, forming said layers into rods extending in the direction of the foreign substance introduced between said layers, embedding said rods in mutually spaced relation within a cylindrical matrix made from a highly conductive material, drawing said matrix cylinder into a smaller diameter thus effecting a corresponding elongation and reduction in diameter of said rods and an inter-metallic bonding between the layers thereof, and heat treating said matrix embedded rods at a temperature high enough to effect diffusion of the material of said first layer into the material of the second layer along mutually spaced zones beween zones in which diffusion is prevented by the presence of said foreign substance or between zones wherein the presence of said foreign substance serves to reduce the superconductive properties of the inter-metallic compound formed at its zones by diffusion into said second layer thereby to establish mutually spaced fine superconductive filaments.

3,874,075

METHOD FOR THE PRODUCTION OF AN INDUCTIVE COMPONENT ELEMENT

Hartwig Lohse, Regensburg, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

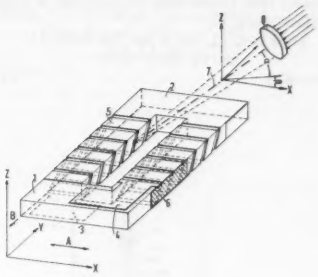
Filed Oct. 26, 1973, Ser. No. 410,237

Claims priority, application Germany, Oct. 31, 1972, 2253412

Int. Cl. H01f *7/06*

U.S. Cl. 29—602 6 Claims

1. A method for the production of an inductive component element, comprising the steps of applying a non-magnetic layer to and at least partially covering a magnetic core of rectangular, ring-shaped configuration having generally oppositely disposed faces connected by respective edge portions, and impacting the layer with a laser beam, incident at an angle of less than 90°, to partially sever selected portions of the layer from other portions thereof on both the faces and adjoining



edge portions, and thereby define a generally helically shaped inductive coil.

3,874,076

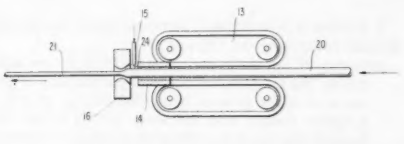
METHOD AND APPARATUS FOR MANUFACTURING SOFT METAL SHEATHS FOR ELECTRICAL WIRES

Akiyoshi Tsukamoto; Hiroyuki Kumamaru; Koichiro Matsuno, and Mahito Ishikawa, all of Yokohama, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka-shi, Japan

Continuation of Ser. No. 128,297, March 26, 1971, abandoned. This application June 27, 1973, Ser. No. 374,151

Int. Cl. H01b *13/22*

U.S. Cl. 29—624 1 Claim



1. In a method of continuously manufacturing a soft metal sheath electric cable by moving a soft metal tape longitudinally in unison with a core and wrapping said tape about said core, the improvement comprising the steps of, in sequence:

surface cleaning said soft metal tape whose width is in excess of that needed to laterally envelope the cable core,

cutting off both side edges of said tape to reduce the width of said tape to a dimension such that the side edges will exactly abut when laterally wrapped about the core and to provide abutting side edges which are oxide free,

bending said tape into an arc in cross section by passing said tape through opposed concave and convex wear resistant plastic rollers,

butting said oxide free tape side edges together by passing said arc-shaped tape through a wear resistant plastic cylindrical shaping tool and a wear resistant plastic forming die having a circular opening therein,

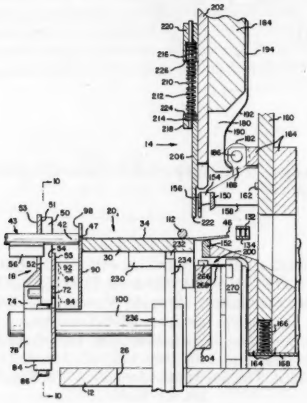
seam welding the butting oxide free side edges,

extracting the tube from said forming die and pushing the tube through a reducing die under lubrication by means of a capstan positioned upstream of the reducing die and downstream of the forming die to uniformly radially inwardly reduce the tube to mechanically couple the soft metal tube to the outer surface of the cable core with true circular cross section provided thereby.

3,874,077
METHOD AND APPARATUS FOR CENTERING AND SHEARING THE FREE END PORTION OF A PLURALITY OF LEADS WHICH EXTEND OUTWARDLY FROM ONE END OF A TEMPLATE

Kenneth Foster Folk, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 12, 1973, Ser. No. 424,131
Int. Cl. H01r *43/00*
U.S. Cl. 29—628 **11 Claims**



1. A method of performing work operations upon a plurality of leads comprising the steps of:

providing an apparatus including template means and shear means, the template means having a plurality of grooves, one end of the grooves being disposed at an end of the template means, and the shear means being disposed beyond said one end of the grooves adjacent said one end of the template means;

positioning the plurality of leads into said plurality of grooves with free end portions of said leads extending beyond the end of the template means and past the shear means;

engaging and positioning the free end portions of said leads in predetermined positions after they have been positioned in said grooves; and

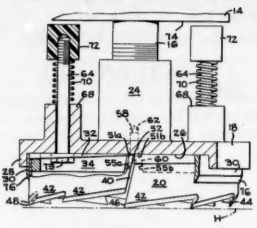
shearing the ends of the free end portions after said free end portions have been positioned in their predetermined positions.

3,874,078
CAN OPENER WITH HELICALLY MOUNTED BLADE

Robert G. Raque, Louisville, Ky., assignor to FMC Corporation, San Jose, Calif.

Continuation-in-part of Ser. No. 301,594, Oct. 27, 1972, abandoned. This application July 2, 1973, Ser. No. 375,400
Int. Cl. B67b *7/30*
U.S. Cl. 30—5.5 **5 Claims**

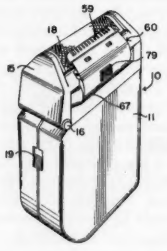
2. In a plunger type can opener of the type comprising a chuck, a thin, split cylindrical knife blade of uniform width and having teeth along one edge thereof, and means for detachably retaining said knife blade in the chuck; the improvement comprising an axially tapered knife blade back up member in said chuck, said knife blade retaining means holding the edge of the knife blade that is opposite said teeth against said back up member so that the said teeth lie in a generally helical configuration.



3,874,079
AUXILIARY TRIMMER ASSEMBLY FOR AN ELECTRIC SHAVER

Robert S. Waters, and Donald L. Shortlidge, both of Lancaster, Pa., assignors to Schick Incorporated, Lancaster, Pa.

Filed June 6, 1974, Ser. No. 477,021
Int. Cl. B26b *19/06, 19/10, 19/02*
U.S. Cl. 30—34.1 **13 Claims**



8. An electric shaver comprising, in combination:

a housing;

a power-driven actuating member contained within said housing;

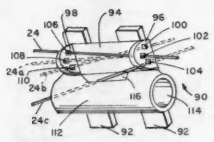
a cutter head of the close-shaving type disposed at one end of said housing, said head including a fixed outer comb member and an inner cutter blade reciprocatively driven by said actuating member;

a trimmer blade assembly for cutting long hair including first and second cutter blades having spaced cutting teeth at one end and arranged for relative reciprocation, and means for maintaining said cutter blades in operative engagement;

means for pivotally mounting said trimmer assembly to said housing, said trimmer blade assembly having two operative position, a retracted position, wherein said cutting teeth are disposed adjacent to and tangentially to said fixed comb member of said close-shaving cutter head, and an extended position, wherein said cutting teeth project away from said housing; and

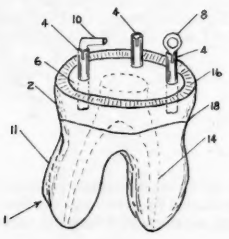
drive means for reciprocatively driving said second trimmer blade in said retracted and extended positions to enable said trimmer blade assembly to assist said close-shaving head in cutting long hairs in said retracted position, and to serve as a precision long hair trimmer in said extended position.

3,874,080
BUCCAL END TUBE
Melvin Wallshein, 8645 Bay Pky., Brooklyn, N.Y. 11228
Filed Mar. 5, 1973, Ser. No. 337,897
Int. Cl. A61c *7/00*
U.S. Cl. 32—14 A **18 Claims**



1. A buccal end tube device for selectively orienting an orthodontic arch wire relative to a tooth, the device comprising two spaced tabs, each of said tabs being provided with arch wire positioning means in the form of at least one aperture, said at least one apertures in said tabs being spaced from each other in the buccal-lingual direction and adapted to receive spaced portions of the arch wire, whereby the arch wire may be disposed in a predetermined orientation within a buccal-lingual plane by positioning the arch wire in said at least one aperture in each of said two spaced tabs and maintained in the selected orientation against the action of external forces applied both to the arch wire and to the buccal end tube device.

3,874,081
DENTAL PIN AND DISPENSER
Mark E. Franklin, 29 Koster Dr., Freehold, N.J. 07728, and James R. Schmidt, 33 Birmingham Dr., Englishtown, N.J. 07726
Filed May 18, 1972, Ser. No. 254,603
Int. Cl. A61k *5/02*
U.S. Cl. 32—15 **13 Claims**



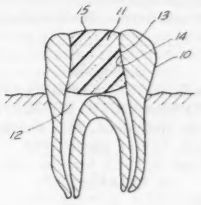
1. An end cutting dental pin which combines cutting and structural elements for use in the reconstruction of a mutilated tooth, the dental pin being adapted sequentially to cut the tooth material of the remaining portion of a mutilated tooth and thereafter to become permanently embedded in and retained as a structural element of the reconstructed tooth, the pin being further adapted for insertion into the remaining portion of a mutilated tooth by the use of a pin mandrel, and comprising a cylindrical structural element which integrally includes:

a. a plurality of passageways through the cylindrical structural element for the retention of restorative material;

b. cutting blades disposed at one end of the cylindrical element, the cutting blades being adapted for cutting a hole in tooth material in the shape and size sufficient to allow the penetration of the pin into the mutilated tooth; and

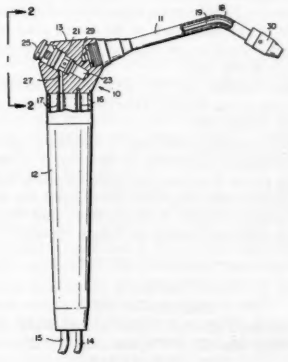
c. engagement means upon the cylindrical element to allow the temporary engagement of the element with a pin mandrel during the cutting of a hole by the blades and the penetration of the pin into the tooth material.

3,874,082
TOOTH TREATMENT METHOD
Lewis Stein, 147-34 Village Rd., Jamaica, N.Y. 11435
Filed June 4, 1973, Ser. No. 366,668
Int. Cl. A61k *5/02*
U.S. Cl. 32—15 **6 Claims**



1. A method of treating a tooth in a mouth, the tooth having a cavity extending into the tooth from its surface, comprising the step of lodging a permeable, resilient, and physiologically inactive material in the cavity, whereby fluid can flow from the cavity through the material and the material prevents food particles in the mouth from flowing in the opposite direction.

3,874,083
ADJUSTABLE NOZZLE DENTAL SYRINGE WITH PULL-ACK VALVE
George F. Buckley, 1021 Laguna Ave., Burlingame, Calif. 94010
Filed July 11, 1973, Ser. No. 378,319
Int. Cl. A61c *19/02*
U.S. Cl. 32—22 **5 Claims**



1. A dental syringe including a handle portion and a tip portion interconnected by a valve body portion and comprising:

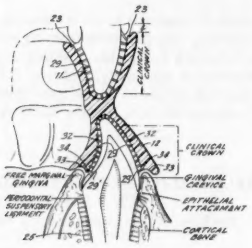
a. liquid conduit means extending through said syringe from an inlet in said handle portion to an outlet at the free end of said tip portion;

b. liquid control means in said valve body portion interposed in said liquid conduit between said inlet and outlet thereof;

c. gas conduit means extending through said syringe independently of said liquid conduit means from an inlet in said handle portion to an outlet at the free end of said tip portion;

d. gas control means in said valve body portion interposed in said gas conduit between said inlet and outlet thereof;
e. nozzle means at the free end of said tip portion communicating with said outlets of both said liquid conduit and said gas conduit; said nozzle means including means providing an orifice of adjustable diameter at said outlet of said liquid conduit, means providing a fixed orifice at said outlet of said gas conduit, and means for adjusting the diameter of said orifice at said outlet of said liquid conduit without change in said fixed orifice at said outlet of said gas conduit and without substantial change in the relationship of said fixed orifice to said adjustable orifice.

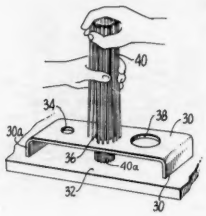
3,874,084
PRESCRIPTION TOOTH-CLEANSING AND GINGIVAL THERAPEUTIC DEVICE
William Lloyd Cole, Hollywood, Fla., assignor to Orville N. Greene, New York, N.Y., a part interest
Filed Dec. 6, 1973, Ser. No. 422,179
Int. Cl. A61c *15/00*
U.S. Cl. 32—40 R **8 Claims**



1. A tooth-cleansing device for cleaning and massaging substantially the entire surface of the teeth comprsing:
a molded body of elastomeric material having arcuate lower channels of the curvature of the lower jaws of the user and a superposed upper channel of the curvature of the upper jaw of the user,
each of said channels having a central portion substantially conforming to the shapes of the clinical crown portions of the teeth of the user,
each of said channels containing undulating gingival interior ledge portions on each side of the central portion, corresponding to the free marginal gingiva of the teeth of the user, whereby when the user chews upon the device, the Free Marginal Gingiva is compressed and released substantially uniformly along the length thereof.

3,874,085
PASTA GAUGE
William F. Atkins, P.O. Box 1812, Carmel, Calif. 93921
Filed May 23, 1973, Ser. No. 363,274
Int. Cl. G01b *3/34*
U.S. Cl. 33—174 T **3 Claims**

1. A pasta gauge for selecting a predetermined serving portion of a plurality of elongated, dried pasta members from a larger bundle of elongate, dried pasta members comprising:
an elongate flat plate member having a top surface and a plurality of spaced apart, hollow, generally cylindrical, vertical bores therein intersecting said top surface perpendicularly in a plurality of spaced apart circular apertures;
each aperture and the associated bore having a predetermined diameter different from the diameter of the other of said apertures and representing, when filled with a bundle of elongate, dried pasta members, an integral number of serving portions each containing a plurality of dried pasta members;
leg means depending downwardly from said plate member for locating said top surface above a supporting structure, said leg means being shorter than the length of the pasta members;



said top surface defining an area surrounding each aperture for supporting the balance of the larger bundle of pasta members apart from the desired serving portion of pasta members which drop by gravity through the aperture down to the supporting structure, whereby the pasta members on the supporting structure may be separated from the pasta members supported on said top surface

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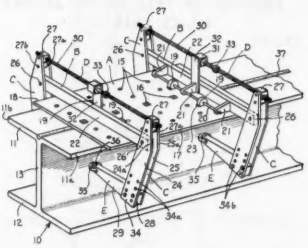
3,874,086
LAYOUT DEVICE
David C. Ludlam, 5828 McMillan Cir., Columbia, S.C. 29210
Filed Apr. 29, 1974, Ser. No. 465,079
Int. Cl. B23b *49/02*; **B23g** *35/02*
U.S. Cl. 33—189 **7 Claims**



1. Apparatus for laying out indicia patterns on a workpiece having a flange carried by a web and the like comprising:
a pattern plate overlying said flange in superposed relation thereto;
spaced frame members carrying said pattern plate for movement longitudinally of said flange;
means maintaining said pattern plate in longitudinal alignment with said flange including;
a pair of opposed depending arms pivotally carried intermediate their ends adjacent respective frame members on opposite sides of said flange;
threadable means interconnecting upper portions of each pair of depending arms; and
inwardly projecting means carried by lower portions of each pair of depending arms extending toward opposite sides of said web;
whereby turning of the threadable means varies the distance between the upper portions of each pair of depending arms moving said inwardly projecting means into engagement with said web on opposite sides thereof maintaining longitudinal alignment of said pattern plate permitting successive indicia patterns to be laid out on said flange as the pattern plate is moved longitudinally.

3,874,087

SURVEYING INSTRUMENT

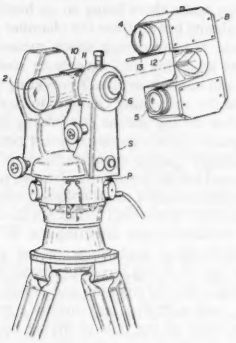
Rene Nunlist, Aarau, Switzerland, assignor to Kern & Co. AG, Aarau, Switzerland

Filed Mar. 19, 1973, Ser. No. 342,882

Claims priority, application Switzerland, Mar. 24, 1972, 4377/72

Int. Cl. G01c *3/04, 1/02*

U.S. Cl. 33—275 **6 Claims**



1. A surveying instrument comprising in combination supporting means, a theodolite mounted on said supporting means and range finding telemetering means carried by said theodolite in a gravity-symmetrical relationship wherein the center of gravity of said telemetering means lies substantially at the intersection of the horizontal axis and the sighting axis of said theodolite, thereby permitting transiting of the assembly in the vertical plane of said theodolite with substantially no imbalance in the assembly.

3,874,088

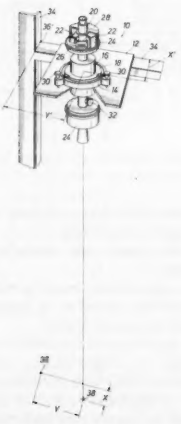
OPTICAL PLUMBING APPARATUS

William Shaffer, Jr., 3103 Carter, Pasadena, Tex. 77503

Filed Feb. 7, 1973, Ser. No. 330,295

Int. Cl. G01c *15/00*

U.S. Cl. 33—286 **4 Claims**



1. An optical plumbing apparatus for locating a point in vertical alignment above a fixed reference point, comprising a planar base with an opening therethrough,

a supporting frame having an opening formed therein and being positionable over said opening in said base,

a tubular collar having a centrally located flange extending in substantially normal relation to said collar, said collar being insertable through said openings in said frame and base, said collar being adjustably supportable on said frame by means of said flange, engaging a portion of said frame

a telescope carried by said tubular collar and being supported for 360° rotation therein, said telescope carrying a level vial at each extremity thereof,

a plurality of adjustable leveling elements being carried by said supporting frame and reacting against said base, said leveling elements being manipulatable for orienting said telescope in a vertical position, and

said leveling elements being slidably movable on said base for precisely aligning said telescope with the fixed reference point.

3,874,089

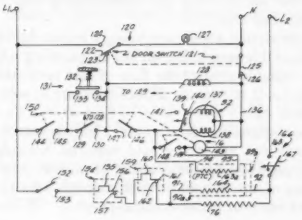
THERMAL COUPLER FOR A DRYNESS CONTROL CIRCUIT

Carl R. Offutt, St. Joseph, Mich., assignor to Whirlpool Corp., Benton Harbor, Mich.

Filed Aug. 27, 1973, Ser. No. 391,552

Int. Cl. F26b *13/04*

U.S. Cl. 34—45 **2 Claims**



1. In combination with a rotatable drum dryer dryer control for controlling drying operations of a dryer having a treatment zone for treating fabrics, comprising:

a programmer including a timer motor for connection to an electrical supply, and timer contacts operated by said timer motor through a programmed sequence for controlling drying operations;

heating means for supplying a flow of heated air to the treatment zone including a heating circuit for connection to the electrical supply and comprising a heater and a thermostat connected in series with said heater and thermally coupled to the treatment zone for opening and closing said series circuit in response to predetermined temperatures in the treatment zone; and

timer control means disposed remotely from said heating means connecting and electrically isolating said timer motor and said heating means, said timer control means comprising a single device having a two terminal input connected to said series circuit, resistance means connected to said two terminal input, a two terminal heat responsive variable impedance output connected to said timer motor and responsive to current flow through said resistance means due to operations of said thermostat to change the impedance of said output between values which are respectively sufficient and insufficient to prevent operation of said timer motor, a casing surrounding said resistance means and said variable impedance means for partially isolating said variable impedance means from the environment and heat sink means connected with said casing for partially coupling said variable impedance means to the environment for controlling the rate of

change in impedance of said variable impedance means when said series circuit is open.

3,874,090

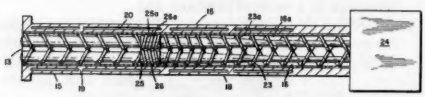
METHOD AND APPARATUS FOR DRYING POLYMERIC MATERIALS

Nathan John McCracken, Sarnia, Ontario, Canada, assignor to Polysar Limited-Polysar Limitee, Sarnia, Ontario, Calif.

Division of Ser. No. 289,567, Sept. 15, 1972, Pat. No. 3,834,440. This application Mar. 2, 1973, Ser. No. 337,701

Int. Cl. F26b *19/00*

U.S. Cl. 34—61 **5 Claims**



1. An improved extruder for drying extrudable polymeric material having at least one rotatable worm screw extending throughout the bore of an elongated extruder barrel having an inlet at one end for introduction of wet material and a single, unrestricted terminal outlet for dry material and vapour at the other end and comprising four serially interconnected zones:

a. a feed zone for receiving and forwarding said material from said inlet;

b. a compression zone wherein said screw is a compression screw for working and compressing said material from said feed zone;

c. a restriction zone comprising a blister on said screw and adjustable restriction means cooperating with said blister to variably control the flow of said material through said zone and to provide a back pressure in said compression zone; and

d. an expansion zone wherein said screw is a conveying screw for advancing said material towards said single, unrestricted terminal outlet of an area not less than the area of the polymeric path through said expansion zone and open to ambient atmosphere.

3,874,091

PRINTED PAPER DRYING DEVICE FOR OFFSET PRINTING

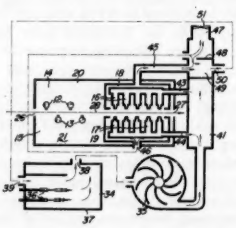
Takaharu Fukumoto, 40-7 Sanno-cho 1-chome, Ota-ku, Tokyo, Japan

Filed Aug. 3, 1972, Ser. No. 277,688

Claims priority, application Japan, Aug. 6, 1971, 46-69707

Int. Cl. F26b *19/00*

U.S. Cl. 34—66 **1 Claim**



1. A printed paper drying apparatus for off-set printing, comprising in combination: a pair of upper and lower drying box-like structures defining space therein having upper and lower direct-fire drying means respectively, for drying upper and lower surfaces respectively of a strip web conveyable therebetween; a hot air drying space means for providing hot air against the strip web, located serially after said upper and lower direct-fire drying means; roller-assembly and air-cooling means defining an air cooling space in juxtaposition to and next in flow series after the hot air drying space means; a vented air collector collection means including a collection space and an exhaust fan mounted therein operatively connected in flow series communication with an upper portion of the air cooling space for variably adjustably controlling exhaust air from the air cooling space; an air heating chamber means for heating air within a chamber space thereof, and mounted in communication with the air heating chamber means chamber space there being an air heating chamber fan for force circulating hot air from the chamber space to a lower portion of said hot air drying space means; and air flow-recycle means including outlet vents to said hot air drying space means and conduit structure providing for recycling the flow thereof to the air heating chamber means; said upper and lower direct-fire drying means comprising opposing serially alternately spaced flame-ejecting burners positioned to alternately and serially expose opposite faces of a strip web to direct flame; said hot air drying space means providing a series of opposingly-directed and axially-aligned substantially coaxially to one-another upper and lower hot-air-ejection nozzles arranged for simultaneously directing hot air onto upper and lower strip web faces; and hinge means pivotably hinge-mounting the pair of drying box-like structures at corresponding edges thereof for the opening and closing of one relative to the other, and including jack means connected between opposite-side edges of the pair of drying box-like structures opposite from the hinge-mounted hinge means, for opening and closing one relative to the other of the pair of drying box-like structures.

3,874,092

DRYING DEVICE FOR A ROTARY DRAGEE-MAKING KETTLE

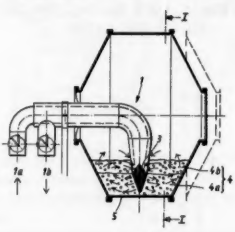
Herbert Huttlin, Steinen, Germany, assignor to Werner Glatt, Haltingen, Germany

Filed Mar. 29, 1974, Ser. No. 456,206

Claims priority, application Germany, Mar. 30, 1973, 2315882

Int. Cl. F26b *11/02*

U.S. Cl. 34—130 **6 Claims**



1. A drying device for dragee-making material in a rotary dragee-making kettle comprising

a stationary air supply pipe extending into the dragee-making kettle,

said air supply pipe having an air permeable headpiece on an end thereof positioned to be immersed in the dragee-making material in said kettle,

an exhaust air pipe adapted for connection to suction means extending into the dragee-making kettle,

said headpiece including wall portions permeable to air and forming an air supply zone and an exhaust air zone connected to said air supply pipe and exhaust air pipe respectively,

both said zones extending into the lower part of the dragee-making kettle so as to be immersed in the dragee-making material for blowing air into the dragee-making material

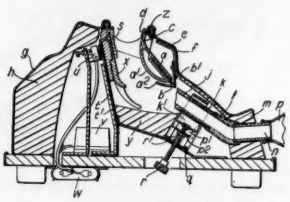
through said air supply zone and exhausting through said exhaust air zone.

3,874,093

RESPIRATORY APPARATUS

Dietmar Rudolf Garbe, Maids Moreton House, Maids Moreton, Buckingham, England

Filed Sept. 14, 1973, Ser. No. 397,387
Int. Cl. G09b *23/32*
U.S. Cl. 35—17 **6 Claims**



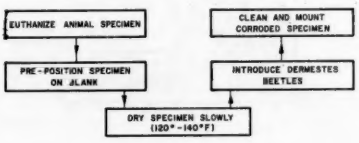
1. An anatomical model for teaching the intubation of the human trachea said model having a larynx part, mouth parts, a tongue part, an epiglottis part joined to the base of the tongue part, an anteriorly movable lower jaw part and a pivotal mounting carried by the lower jaw part and positioned adjacent the junction of the epiglottis and tongue parts, the epiglottis and tongue parts being simulated by an assembly which is pivotally movable about said pivotal mounting and biassed into a normal position by elastic resilience of the tongue part, said elastic resilience and anterior movability of the tongue part with the jaw part co-operating to simulate visual exposure of the larynx part by manipulation through the mouth parts with a laryngoscope.

3,874,094

PREPARATION OF SKELETAL DISPLAY OF ANIMALS

Walter J. Mackey, 1991 Sharondale Ave., St. Paul, Minn. 55113

Filed Feb. 6, 1974, Ser. No. 439,874
Int. Cl. G09b *23/36*
U.S. Cl. 35—20 **8 Claims**



1. The method of preparing natural skeletons for insect corrosion of an animal specimen which includes the steps of:
a. euthanizing the animal specimen;
b. removing the skin layer from the euthanized animal specimen and placing the skinned specimen in a restrained position upon a mounting base; and
c. dehydrating the specimen at a temperature of from between about 125° F. up to 160° F. for a period of from about 3 to 14 days.

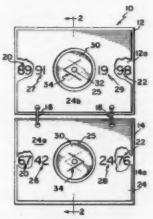
3,874,095

EDUCATIONAL AID FOR TEACHING INEQUALITIES

Kay L. Dewaele, 224 Murphy St., Bay City, Mich. 48706

Filed Mar. 6, 1973, Ser. No. 338,574
Int. Cl. G09b *19/02*
U.S. Cl. 35—31 R **15 Claims**

1. An educational device for the individualized teaching of inequalities comprising:
support means;
quantity indicating means representing a plurality of different quantities at each end of said support means;
inequality means, disposed between the quantity indicating means at opposite ends of said support means and movable to selected positions on said support means, for selectively indicating that a quantity represented at one



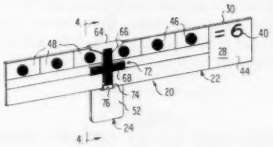
end of said support means is greater than a quantity represented at the other end of said suport means; and
means mounted on said support means swingably mounting said indicating means for turning movement on said support means to and from a position in which said indicating means indicates that a quantity at the other end of said support means is greater than a quantity represented at said one end.

3,874,096

EDUCATIONAL FLASH CARD ASSEMBLIES

Catherine J. Romstad, 500 Henes Pk. Dr., Menominee, Mich. 49858

Filed Nov. 1, 1973, Ser. No. 411,639
Int. Cl. G09b *1/36*
U.S. Cl. 35—31 E **12 Claims**



1. An educational flash card device comprising:
a plurality of interengaged exhibitor members each having a back panel with opposite front and rear surfaces;
the front surface of the panel comprising a slide surface, at least a portion of which is exposed when the members are disengaged;
at least one of the exhibitor members having a fold portion;
the back panel of said one exhibitor having a slit formed therein at a location remote from the fold portion;
the front panel of said one exhibitor, having inner and outer surfaces, the outer surface having indicia thereon;
a tab extending from the front panel of said one exhibitor and extended through said slit of said back panel whereby said one exhibitor member forms a sleeve portion; and
the sleeve portion of said one exhibitor being engaged about the back panel of another exhibitor.

3,874,097

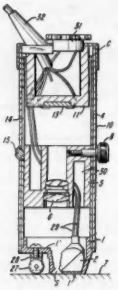
READING AID FOR THE BLIND

Hans A. Mauch; Glendon C. Smith, both of Dayton, Ohio, and Richard Bennett, San Jose, Calif., assignors to The United States of America as represented by the Veterans Administration of the United States Government, Washington, D.C.

Filed Jan. 8, 1973, Ser. No. 321,851

Int. Cl. G09b *21/00;* **G06k** *9/13*

U.S. Cl. 35—35 A **27 Claims**



1. Apparatus for use in scanning and translating objects scanned into audible sound, comprising a scanner device embodying means for observing visually perceptive patterns, means connected with said observing means to produce a signal or signals composed of a tone or tones, and combinations thereof, arranged to correspond to the shape of the visually perceptive pattern observed and to change in correspondence with changes in its observed shape, means defining two separate channels for separately receiving and transmitting the said tone or tones, or combinations thereof making up said signal or signals, means in at least one of said channels for modifying the amplitude of individual tones of said signal or signals by different proportions, volume control means in at least one of said channels for modifying the amplitudes of all tones of said signal or signals in said channel by a common porportion, and output means connected to each of said channels to separately direct the output from one of said channels to one ear of a user of said apparatus and the output from the other of said channels to the other ear of the user.

3,874,098

HELIOCENTRIC-GEOCENTRIC ORRERY PROJECTOR

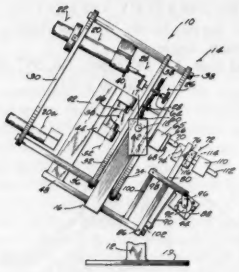
Kenneth C. Mosley, 224 Murphy St., Grand Rapids, Mich. 48706

Filed Oct. 15, 1973, Ser. No. 406,555

Int. Cl. G09b *27/02*

U.S. Cl. 35—42.5 **20 Claims**

1. Apparatus for projecting a moving image onto a screen comprising, in combination: a support; a subframe movably anchored to said support; first image projector means anchored to said subframe and movable therewith; second image projector means movably secured to said subframe; means for selectively anchoring said subframe to said support and releasing it for movement relative thereto; first drive means for said second image projector means such that when said subframe is stationary relative said support, the image projected by said second image projector means describes orbital movement about the stationary image projected by said first image projector means; and second drive means for said subframe such that when said subframe is movable relative said support, the movement of said subframe counteracts the movement of said second image projector means such that the image projected onto the screen is stationary and the image projected by said



first image projector means describes orbital movement about said stationary second image.

3,874,099

APPARATUS FOR DEMONSTRATING THE MODE OF OPERATION OF SAFETY SKI BINDINGS MOUNTED ON SKIS OR WOOD SPECIMENS

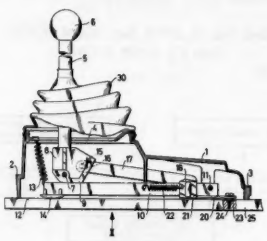
Egon Heckl, Riedwiesenstrasse 10, 81 Garmisch-partenkirchen, Burgrain; Roland Jungkind, Torlenstrasse 43, 81 Garmisch-Partenkirchen, and Bernd Payrhammer, Westermuhlstrasse 13, 8 Munich 2, all of Germany

Filed June 19, 1973, Ser. No. 371,381

Claims priority, application Germany, July 4, 1972, 2232783

Int. Cl. G09b *25/00*

U.S. Cl. 35—49 **7 Claims**

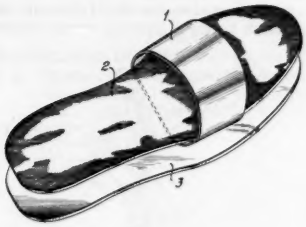


1. Apparatus for demonstrating the mode of operation of safety ski bindings mounted on skis or wood specimens, which apparatus comprises a dummy which corresponds to at least the sole of a skiing boot in shape and size and is provided with means by which the dummy when held in the binding can be deflected upwardly at its rear end and laterally at its forward end, and a lever for operating the deflecting means, characterized in that the operating lever is mounted in the rear one-third of the dummy on a horizontal transverse axis and in a normal position extends upwardly in an approximately vertical direction and can be pivotally shifted forwardly and rearwardly against spring force, that a lever arm is connected to and angled from the operating lever and adapted to deflect the dummy upwardly, that a bar linkage is connected to the operating lever and adapted to deflect the dummy laterally as the operating lever is shifted in the opposite sense, and that an abutment for the bar linkage is adapted to be secured to the ski or the wooden base.

3,874,100
HYGENIC FOOT PROTECTOR

Henry Schwitters, 2944 Wittmund Burgstrasse, Wittmund, Germany

Filed Jan. 23, 1974, Ser. No. 435,922
Int. Cl. A43b 3/12, 1/02
U.S. Cl. 36—11.5 4 Claims

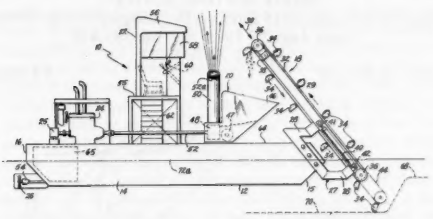


1. A hygenic foot protector such as a sandal comprising:
a foot sole for supporting the foot of the user;
a walking sole adhesively secured to the foot sole for contact with a supporting surface; and
an endless annular ring constructed of a continuous strip of material bonded between said foot sole and said walking sole to receive the foot of the user, said soles and said ring being constructed of a disposable paper product.

3,874,101
DREDGER WITH ADJUSTABLE ENDLESS DIGGER AND ROTARY MUD SLINGER

Oliver Frank Cummins, 1208 Kiplino Ave., Islington, Ontario, Canada

Filed Jan. 31, 1974, Ser. No. 438,367
Int. Cl. E02f 3/14, 9/04
U.S. Cl. 37—69 6 Claims

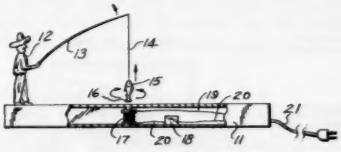


1. A mud excavator, comprising: a floatable hull; a conveyor frame; an arm mounted on each side of said hull inclined upwardly and rearwardly, each of said arms including a portion at each end thereof projecting to a point clear of said hull and supporting said conveyor frame for lengthwise adjustment thereof relative to said arms and hull; a cylinder pivotally mounted upon one projecting portion of each of said arms; a piston rod extending from each cylinder; means pivotally connecting one end of each piston rod to said conveyor frame for effecting said lengthwise adjustment thereof; an endless conveyor on said frame having scoops for excavating purposes; means connected with said endless conveyor for driving the same; a hopper mounted upon said hull in a position to receive material discharged from said conveyor scoops; a rotary mud slinger communicating with the lower portion of said hopper and having a discharge pipe; and drive means connected with said mud slinger.

3,874,102
SLOWED ALTERNATING CURRENT MAGNETIC NOVELTY

Elwood H. Sheppard, 223 Bonita Pl., Denver, Colo. 80234

Filed Nov. 7, 1973, Ser. No. 413,672
Int. Cl. G09f 19/02
U.S. Cl. 40—106.45 1 Claim

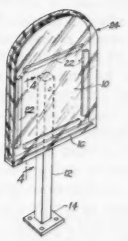


1. A Slowed Alternating Current Magnetic Novelty, comprising in combination, a hollow base, an electromagnetic coil and a switching means within said base, means for producing an electromagnetic force, a figurine fixedly secured upon said base, said figurine holding one end of a fishing pole, a flexible line secured to the other end of said pole, the free end of said line being attached to a simulated fish having a permanent magnent secured therein, said simulated fish accordingly depending vertically in downwardly direction due to gravity, said simulated fish magnet being within a magnetic field of said electromagnetic force whereby said electromagnetic force causes said gravity depending simulated fish to move toward said coil producing an animated like movememt of said simulated fish.

3,874,103
DISPLAY DEVICE

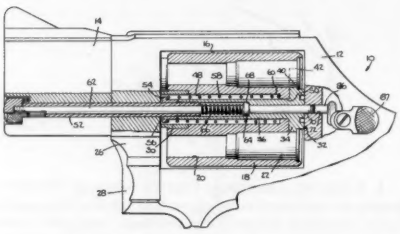
Ted J. Muta, 1817 Fisher Pl., Munster, Ind. 46321

Filed May 21, 1973, Ser. No. 361,896
Int. Cl. G09f 07/04
U.S. Cl. 40—125 H 2 Claims



1. A display device for printed material in sheet form comprising upstanding support means, a back panel mounted on but spaced from the support means to define a space therebetween spacing means in said space having a width less than the width of the support means adapted to support the back panel on the support means in a spaced relation, said back panel being adapted to receive a sheet of printed material in surface contact therewith, at least one magnetized bar adapted to engage the printed material to secure the printed material thereto, and a continuous transparent bubble member open along its bottom encasing the back panel, the printed material and the bar to protect the printed material from the elements, said bubble member including a vertical slot therein, said slot being adapted to receive the spacing means with the leading edge of the slot resting on the spacing means.

3,874,104
CARTRIDGE CASING EXTRACTION MECHANISM FOR REVOLVERS
Harold E. Sibley, West Springfield, Mass., assignor to Bangor Punta Operations, Inc., Greenwich, Conn.
Filed Nov. 8, 1973, Ser. No. 414,607
Int. Cl. F41c *1/00, 15/00*
U.S. Cl. 42—68 **10 Claims**



1. A revolver comprising; a frame having an opening and a barrel, a yoke pivotally carried by said frame, a cylinder pivotally carried by said yoke and pivotal with said yoke between a firing position locating said cylinder within said frame opening and a cartridge casing extraction and loading position to one side of said frame, a centerpin carried by said cylinder and mounted for axial sliding movement between first and second positions, means biasing said centerpin for axial movement into said first position, means carried by said frame for locking a rear end portion of said centerpin to said frame when said cylinder lies in said firing position and said centerpin lies in said first position and for releasing the rear end portion of said centerpin from said frame when said centerpin is axially displaced from said first position into said second position, a cartridge casing extractor carried by said cylinder for axial movement in a direction generally parallel to the rotational axis of said cylinder, an extractor thumbpiece carried by a forward end portion of said centerpin, said thumbpiece being recessed along its rear face to define an arcuate rearwardly projecting flange, a channel mounted below said barrel, said channel having an arcuate recess substantially surrounding a foward end portion of said channel for receiving the thumbpiece flange and for locking said thumbpiece to said barrel and for releasing the forward end portion from said barrel when said centerpin is axially displaced from said first position into said second position, said centerpin in said second position thereof unlocking said cylinder from said frame and enabling said cylinder to swing from said frame opening to said one frame side, and means coupling said extractor thumbpiece and said extractor to enable displacement of said extractor axially away from said cylinder when said cylinder is located on said one frame side for complete extraction of cartridge casings from said cylinder.

3,874,105
AUTOMATIC FISH-HOOKING DEVICE
Robert T. Andree, 1150 Altadena Ave., and Horst R. Hickmann, 1455 Montegor Dr., both of Cincinnati, Ohio 45230
Filed July 30, 1973, Ser. No. 384,112
Int. Cl. A01k *97/10*
U.S. Cl. 43—15 **8 Claims**

1. An automatic fish-hooking device comprising:

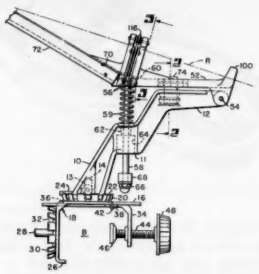
first and second elements pivotally secured to one another and being pivotal between a cocked position closely adjacent to one another and a released position where they are pivoted away from one another, said first element forming a base and having a pair of spaced forked supports for resting a fishing rod;

means on said second element intermediate said forked supports for releasably urging said fishing rod in place against both forked supports;

a guide rod mounted on one of said elements and extending through a bore in the other element;

an element urging means comprising a compression spring surrounding said guide rod and acting against said first and second elements for yieldably urging said elements toward said released position;

a latch pivotally mounted on one of said elements, the other of said elements having at least one recess receiving said

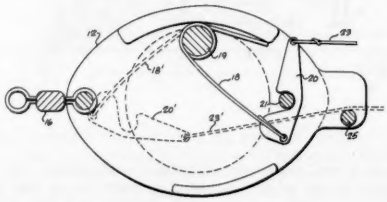


latch to hold said elements in the cocked position, said latch being positioned between said pivotal mounting of said elements and said guide rod;

means for yieldably urging said latch out of said recess, the friction between said latch and said recess being sufficient when said elements are in said cocked position to prevent said latch-urging means from displacing the latch out of said recess except when said elements are pivoted toward one another from said cocked position; and

means on said guide rod for limiting displacement of said elements away from one another.

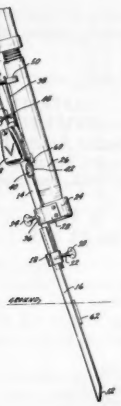
3,874,106
HOOK SETTING DEVICE
Scott M. Edwards, 6845 Fairways Dr., Longmont, Colo. 80501
Filed Aug. 20, 1973, Ser. No. 389,838
Int. Cl. A01k *85/02*
U.S. Cl. 43—15 **8 Claims**



1. A device for setting a fishhook in response to the taking of a hook by a fish, comprising: a compact body member having means for attachment to a fish line from a fishing pole at one end of the body member, the body member having an open interior defined therein, spring means secured to the body member within the open interior and including a provision for operable connection of the spring means to the line to which the hook is attached, a post member positioned within the open interior, trigger means constituting part of the spring means for releasably securing the spring means to the post member in a distended position, the trigger means including an elongated structure having an open notch in one side

thereof, provision for attachment to the fish line to which the fishhook is secured on one end, and provision for attachment to a spring member comprising part of the spring means on the other end, whereby the hook-setting device may be secured along the length of the fish line and played out with the fish line to provide a prompt release of the distended spring means to automatically set the hook through a minimum length of fish line, and with the movable components of the device within the body member to avoid fouling.

3,874,107
FISHING ROD HOLDER AND SIGNAL DEVICE
Frank J. Wheaton, 2727 De Anza, San Diego, Calif. 92131
Filed June 19, 1974, Ser. No. 480,637
Int. Cl. A01k *97/12*
U.S. Cl. 43—17 **12 Claims**

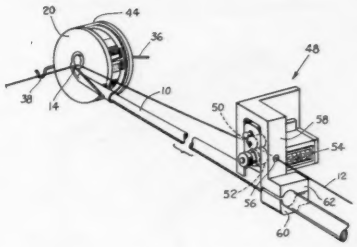


1. A combined fishing rod holder and signal device which comprises a vertical support member adapted to be anchored in the ground, a receptacle member adapted to support the lower portion of the handle of a fishing rod, said receptacle being affixed to said support at an intermediate point thereof, a guide member disposed vertically above said receptacle and adapted to co-act with said receptacle and position the handle of the fishing rod, a resilient member pivoted to said support member and at the upper extremity thereof is affixed said guide member, combination alarm and electric power means connected to said support, said resilient member being electrically conductive and in electrical connection with said electric supply, and said support being electrically conductive, a conductive detent connected to said guide member and also connected to said resilient member, said detent normally spaced from said support member, said rod holder anchored in the ground such that said receptacle, resilient and guide members face away from the body of water, whereby when a fish is hooked and its struggling pulls on the fishing rod, said resilient member bends and said detent contacts said support completing a circuit to said alarm, which alarm emits an audible signal.

3,874,108
DEVICE FOR DETERMINING THE DEPTH OF A TROLLING PLUG
Loly V. Connor, 2018 Breazeale Dr., Anderson, S.C. 29621
Filed May 13, 1974, Ser. No. 469,301
Int. Cl. A01k *87/02*
U.S. Cl. 43—25 **5 Claims**

1. An apparatus fc .iounting on the end of a fishing rod for aiding in determining the depth that a fishing plug which is attached by a line is running while trolling from a moving boat, said apparatus including:

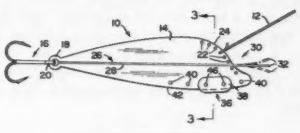
a. a housing;
b. means for mounting said housing on an end of said fishing rod;
c. a freely rotatable transverse shaft carried by said housing;
d. a radially extending arm carried by said transverse shaft;
e. an eyelet carried on one end of said radially extending arm through which said line extends for causing said radially extending arm to assume the same angle to a horizontal plane as said line;



f. a weighted, pivotal member carried by said housing, a calibrated scale carried on said pivotal member that is maintained in substantially the same position regardless of the angular position of said rod, and
g. a pointer movable by said radially extending arm adjacent said calibrated scale for indicating the angular position of said line relative to a horizontal plane;

whereby the depth that said plug is running behind said boat can be determined from the angular reading indicated by said pointer for a known length of line.

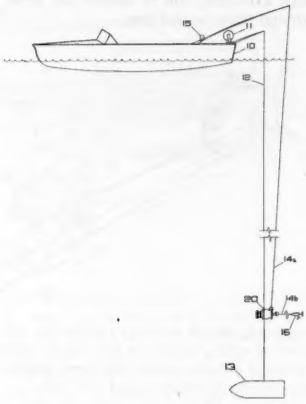
3,874,109
TEASE SPOON
Carmen A. Peterson, 38 Pilot Pl., New Port Richey, Fla. 33552
Filed Feb. 26, 1973, Ser. No. 335,465
Int. Cl. A01k *87/06*
U.S. Cl. 43—42.22 **6 Claims**



1. A fishing lure of the type to be towed through water by a line, said lure comprising: a body, line connecting means formed on said body, ballast means connected to said body, ballast connecting means formed on said body adjacent the lower peripheral edge thereof, stabilizing means including a one piece flange connected to said body, said flange comprising a flexible beak portion integrally connected to the rest of said flange and substantially defining the leading portion of said lure, whereby said beak portion may be fixedly oriented out of the plane of the remainder of said stabilizing flange and thereby at least partially determine the path of travel of said lure; said line connecting means comprising a plurality of apertures arranged in substantially spaced relation to one another said plurality of apertures extending continuously from an upper peripheral edge of said body to a point adjacent the forwardmost leading edge of said body, said apertures extending in a continuous fashion on both sides of said stabilizing flange, whereby the point of connection of the line to said line connecting means at least partially determines, along

with the predetermined position of said beak portion, the path of travel of said lure through water.

3,874,110
DOWNRIGGER LINE RELEASE
Raymond D. Larson, 105 Sixth St., Waunakee, Wis. 53597
Filed Apr. 3, 1974, Ser. No. 457,450
Int. Cl. A01k *91/04*
U.S. Cl. 43—43.12 **4 Claims**



1. A downrigger line release device for a trolling system comprising:

a. a magnet body having a flat surface and a recess in said flat surface,

b. attachment means for attaching the magnet body to a cable supporting a weight, and

c. a magnetic line release means including a disc portion for magnetically engaging the magnet body flat surface and having means for engaging a fishing line extending from a fishing rod, a head portion extending from the disc portion for engagement within the recess in the magnet body flat surface to prevent the disc portion from being transversely disengaged from the magnet body by a transverse force applied to the disc portion line engaging means, and a stem portion extending from the disc portion and having means for engaging a fishing line extending to a fishing lure, said magnetic line release means being separable from the magnet body flat surface when a force is applied to the stem portion line engagement means.

3,874,111
TOY BULLDOZER
Ronald R. Pauly, Mound, and Curtis H. Fahrendorff, Minneapolis, both of Minn., assignors to Tonka Corporation, Hopkins, Minn.
Filed Jan. 30, 1974, Ser. No. 437,881
Int. Cl. A63h *33/30*
U.S. Cl. 46—40 **2 Claims**

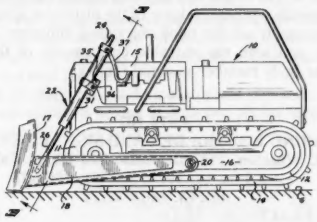
1. In a toy bulldozer,

a. a tractor,

b. a bulldozer blade extending across the front of the tractor with a pair of arms extending rearwardly from the blade one on each side of the tractor and having their rear ends pivoted to the tractor on a common horizontal axis extending transversely of the tractor,

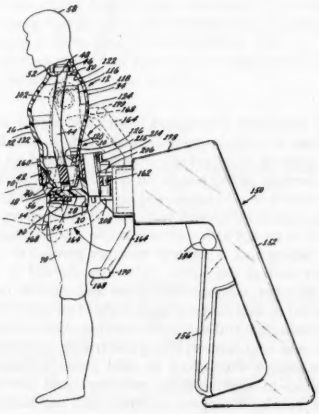
c. an inverted U-shaped handle having parallel legs extending downwardly one on each side of the tractor with their lower ends pivotally connected to the rear side of the bulldozer blade,

d. a pair of elongated cylinders mounted one on each side of the tractor each slidably receiving one of said handle legs, and



e. locking means acting between at least one of said legs and cylinder for releasably locking the leg in various positions therein.

3,874,112
ANIMATING DEVICE FOR FIGURE TOYS
Jurgis Sapkus, Manhattan Beach; J. Stephen Lewis, Pacific Palisades; Kurt Ruppel, Redondo Beach, and John T. Benson, Encino, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.
Filed Dec. 26, 1973, Ser. No. 427,873
Int. Cl. A63h *11/00*
U.S. Cl. 46—119 **7 Claims**



1. In combination with a figure toy having rotatable appendages and a torso, an animating device, comprising:

hand grip means adapted to be releasably connected to said figure toy and manually manipulated by a user of said animating device;

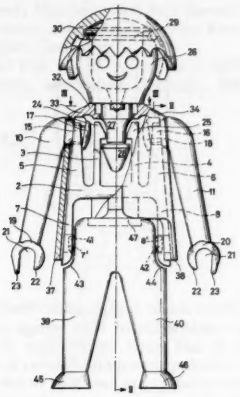
connecting means engageable with said torso for connecting said hand grip means thereto with the major axis of said hand grip means intersecting the major axis of said figure toy substantially normal thereto; and

pivot pin means swingably connecting said connecting means to said hand grip means, the major axis of said torso being substantially parallel to the major axis of said pivot pin means, whereby said figure toy may be swung through an arc about said pivot pin means.

3,874,113
DOLL WHEREIN HEAD CONNECTS TO A SUPPORT MEMBER THEREBY LOCKING ON BODY AND LIMBS

Hans Beck, Kreutles, Germany, assignor to Georg Brandstatter, Zirndorf, Germany

Filed Feb. 2, 1973, Ser. No. 328,891
Int. Cl. A63h *3/00*
U.S. Cl. 46—161 **6 Claims**



1. A toy figure comprising:

an elongate support member, a head member having a neck portion, two arms, two legs, joined at the upper ends thereof, and means for cooperating with said support member and head to connect said head, arms and support member,

said support member having a pair of first bearing means for pivotally receiving the legs at the joined ends thereof, a pair of second bearing means, each for pivotally receiving one of said arms and locking means for releasably locking the neck portion of said head member,

said legs having pins at the joined ends thereof, said pins being engaged with said first bearing means for pivoting the legs about an axis transverse of the lengthwise axis of the support member,

each of said arms having at one end thereof pivot means releasably engageable with the respective second bearing means,

said head member being insertable with its neck portion into said locking means of the support member for releasably locking therein, and

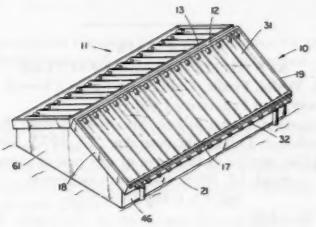
said means for connecting said head, arms and support member comprising a hollow body member which is open at one end and closed by an end wall at the other end, said end wall including an opening for passage of said neck portion, the body member being fittable upon the support member, the end wall of the body member in the fitted position thereof locking the arms to the support member and the head member in its locked position locking the body member to the support member.

3,874,114
PLANTBED COVER ASSEMBLY

Narvell E. Rowell, R.R. 1, Commiskey, Ind. 47227

Filed Sept. 26, 1973, Ser. No. 400,823
Int. Cl. A01g *13/04, 9/24;* **E06b** *7/08*
U.S. Cl. 47—29 **3 Claims**

1. A plantbed cover assembly comprising two rectangular frames hingedly joined to each other along one of the marginal side members of each frame and adapted to be supported spaced above a plantbed with the hinged side members above the remaining marginal side members of the frames to thereby dispose both frames in oppositely inclined planes over the plantbed, each of the frames carrying a series of narrow vanes arcuate in cross section and formed of a rigid light-transmitting plastic material, said vanes being arranged parallel to each other and provided with support members which extend from the end of the vanes and freely through journalling apertures in the frame side members, and vane displacing means for rotating said support members in unison through ninety degrees to thereby move said vanes between a first position in which their concave surface faces upwardly and a second position in which their concave surface faces sidewardly, the side margins of adjacent vanes being closely

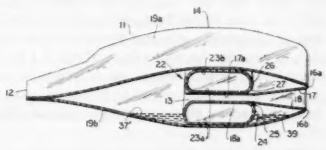


spaced from but not engaging each other when said vanes are in said first position, said vane displacing means comprising a plurality of pins each having an eyelet head and a shank portion, a throw bar extending parallel to and closely adjacent to one of the remaining marginal side members of the frame and resting on said vane support members, the eyelet head of the pins being pivotally attached to the throw bar and the shank portion of each pin extending at an acute angle from the throw-bar and rigidly secured to the extending support member of one of said vanes, whereby as said throw bar is moved upwardly and longitudinally said support members are rotated and the vanes attached thereto are moved between said first and second positions.

3,874,115
NONSPILL FLEXIBLE PACKAGE FOR SHIPPING AND STORING CUT FLOWERS OR THE LIKE

Herbert S. London, 1730 Merton Rd., N.E., Atlanta, Ga. 30306, and William Jackson Seay, 330 Woodward Way, N.W., Atlanta, Ga. 30305

Filed Feb. 11, 1974, Ser. No. 441,034
Int. Cl. B65d *37/00*
U.S. Cl. 47—34.11 **4 Claims**



1. Flexible package for receiving cut flowers or the like, comprising:

an elongate bag made of a pliant, liquid-impermeable material;

said elongate bag having sides of substantially a flat configuration extending from a closed bottom end to a top end which is open to admit the stems of a bunch of cut flowers or the like;

an inflatable member secured within said elongate bag in annular surrounding relation with said open top end;

said inflatable member extending within said elongate bag along substantially less than the entire elongate length of said bag so that space remains between said inflatable

member and said closed bottom end to receive the cut ends of flower stems and also to receive and retain a quantity of liquid;

said inflatable member when uninflated leaving said open top end substantially unobstructed to the entry of such flower stems or the like;

said inflatable member, when expanded by inflation, snugly surrounding and engaging such flower stems or the like which are extending through said open top end there being an area between the outer surface of said inflatable member and the bag portion adjacent thereto for water passage therebetween when said package is upended; and means in fluid flow communication with said inflatable member to admit pressurized fluid to said inflatable member.

3,874,116

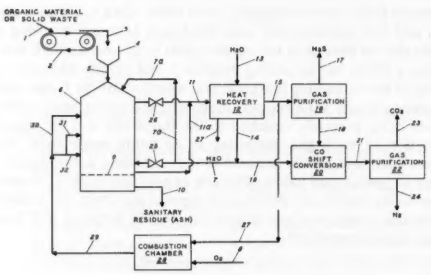
SYNTHESIS GAS MANUFACTURE

Robert J. White, Pinole, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 39.116, May 20, 1970, abandoned. This application Apr. 27, 1973, Ser. No. 355,353The portion of the term of this patent subsequent to Sept. 18, 1990, has been disclaimed.

Int. Cl. C10j *3/00, 3/16*

U.S. Cl. 48—209 **16 Claims**



1. A process for producing synthesis gas under substantially endothermic reaction conditions, which comprises reacting a solid organic feed material with steam in a reaction zone by:

a. passing said feed into the zone, said feed comprising carbon, hydrogen and oxygen in chemical combination wherein at least 25 weight percent of the feed is said oxygen and less than 5 weight percent of the feed, calculated as elemental sulfur, is sulfur;

b. feeding steam into the reaction zone and into contact with said feed, said steam being introduced in an amount sufficient to maintain a gas mol fraction of the steam in the reaction zone in the range from about 0.1 to 0.9 and said steam being at a temperature sufficient to substantially provide the heat required to effect said contacting at a temperature in the range from about 500°F. to 1,600°F.; and

c. recovering a synthesis gas having a $(CO_2 + H_2)/CO$ mol ratio of at least 1.5.

3,874,117

ELECTRIC DOOR OPENER

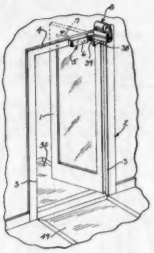
Raymond H. Boehm, Racine, Wis., assignor to R. H. Boehm Company, Inc., Racine, Wis.

Filed Sept. 28, 1973, Ser. No. 401,841

Int. Cl. E05f *13/00*

U.S. Cl. 49—264 **15 Claims**

1. An electric door opener to be operably connected to a door to open the same, comprising a uni-directional electric motor having an output shaft, a worm gear unit connected to said output shaft, gear means having an input and an output, electromagnetic clutch means interconnecting the worm gear unit and the input of the gear means, said clutch means having an engaged and a disengaged position, a pivotable linkage connecting the output of the gear means to the door, operation of said gear means acting to pivot the door through said linkage to an open position, approach switch means located ahead of the door and disposed to be actuated by a person approaching the door, means responsive to actuation of said



approach switch means for engaging said clutch means and for supplying the combination of high voltage power and low voltage power to said motor, deactivation of said approach switch means curtailing the supply of power to said motor and disengaging said clutch means, and limit switch means responsive to opening of the door to a predetermined position for withdrawing the high voltage power and maintaining the supply of low voltage power to said motor whereby the low voltage power will retain the door in the open position.

3,874,118

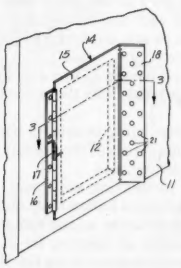
ANIMAL ACTUATED DOOR

John C. Robinson, 2931 N. Hendricks, Hutchinson, Kans. 67501

Filed Dec. 14, 1973, Ser. No. 424,912

Int. Cl. E05d *7/00*

U.S. Cl. 49—402 **10 Claims**



1. In combination with a doorway, an animal-operated door comprising a rigid closure plate adapted to cover the doorway, hinge means connecting one side edge of the closure plate to a side margin of the doorway, spring means biasing the closure plate toward closed position over the doorway, and an inclined flange on the opposite side edge of the closure plate and merging smoothly therewith which permits non-injurious ingress or egress, said flange extending at an obtuse angle to said plate such that when the closure plate is in closed position over the doorway the flange defines, with respect to the adjacent side margin of the doorway, a tapering recess shaped to substantially conform with the shape of an animal's snout, whereby to enable an animal to engage its snout in the recess and thus force the closure plate open and to thereby allow the animal to pass through the doorway, said flange being of

substantial height and extending along said adjacent side margin for a sufficient vertical length to allow a wide range of sizes of animals wishing to pass through the doorway to be able to insert their snouts in the recess.

3,874,119
DOOR FOR VEHICLES, ESPECIALLY PASSENGER MOTOR VEHICLES

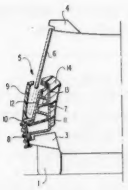
Hermann Renner, Magstadt, and Bela Barenyi, Maichingen, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany

Filed Feb. 15, 1973, Ser. No. 332,589

Claims priority, application Germany, Feb. 15, 1972, 2206998

Int. Cl. B60j *5/04*

U.S. Cl. 49—502 **23 Claims**



1. A vehicle door comprising

an outer cover means for protecting the outer surface of a vehicle door structure, said outer cover means being open in the downward direction to drain liquid from the interior of the vehicle door structure, and

an inner reinforcement means adapted to project into a vehicle interior to form the inner surface of said vehicle door structure, said inner reinforcement means including at least first and second panel members forming a completely closed hollow bearer reinforcing structure at the interior side of the vehicle door structure,

said outer cover means and said inner reinforcement means being spaced from one another at an upper portion thereof to form a window accommodating means between said outer cover means and said inner reinforcement means.

3,874,120
KNIFE SHARPENER, PARTICULARLY FOR A MICROTOME

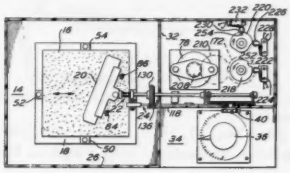
Robert J. Dalton, deceased, late of Haddonfield, N.J., (by Ruth C. Dalton, executrix); Frederick W. Pfleger, Cherry Hill, N.J., and John Y. Steel, Jenkintown, Pa., assignors to Arthur H. Thomas, Company, Philadelphia, Pa.

Filed Feb. 6, 1973, Ser. No. 330,127

Int. Cl. B24b *3/48*

U.S. Cl. 51—59 R **18 Claims**

1. In a knife sharpener, means for holding a knife against an abrasive surface for sharpening the knife edge, drive means for displacing said knife and said surface relative to each other, the direction of relative displacement between said knife and surface being at an oblique angle with respect to the cutting edge of said knife, means for automatically changing said angle from a first predetermined angular position to a second predetermined angular position in response to a measured amount of relative displacement of said knife and surface, and means to turn the knife over to sharpen an opposite



side of the edge in response to a further measured amount of relative displacement of said knife and said surface.

3,874,121
WORKPIECE MOUNTING APPARATUS FOR AN INTERNAL GRINDING MACHINE

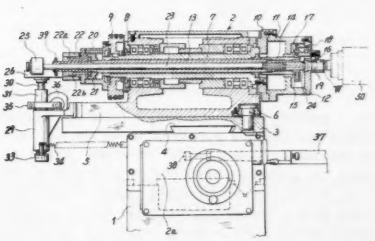
Makoto Kikuchi, Kariya, and Ikuo Otsu, Toyota, both of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya-shi, Aichi-ken, Japan

Filed Oct. 5, 1973, Ser. No. 403,869

Claims priority, application Japan, Oct. 19, 1972, 47-120094

Int. Cl. B24b *5/10*

U.S. Cl. 51—105 R **6 Claims**



1. An apparatus for mounting a workpiece in an internal grinding machine having a bed, a spindle head slidably mounted upon said bed, a table slidably mounted upon said bed and movable toward and away from said spindle head, and a whheel head mounted upon said table and rotatably carrying a grinding wheel, comprising:

a main body of said spindle head;

a spindle rotatably mounted on said main body;

a chuck housing fixedly mounted on said spindle at one end thereof and provided with a reference face;

clamping means axially slidably mounted within said spindle and provided for clamping the workpiece on the reference face of said chuck housing;

aligning means disposed within said spindle in axial alignment therewith and having an aligning portion for establishing alignment between the axis of the workpiece and the axis of said spindle through engagement with the cylindrical bore of the workpiece when the workpiece is clamped on said reference face by means of said clamping means;

a measuring gauge integrally provided on said aligning means and adapted to be snugly inserted into the cylindrical bore of the workpiece to confirm the completion of the machining operation when the bore is machined into a finished size; and

positioning means mounted on said main body and capable of selectively projecting said alignment means from the

one end of said chuck housing through first and second predetermined distances so as to align the workpiece with said spindle by said aligning portion and confirm the completion of the machining operation by said measuring gauge.

3,874,122

GRINDING MACHINE

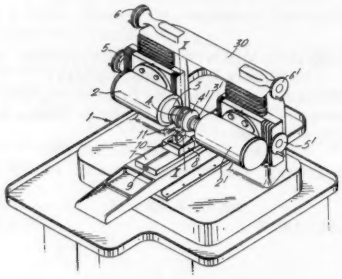
Maurice Miller Ward, April Cottage Ringwood Rd., Ferndown, England

Filed Nov. 27, 1973, Ser. No. 419,288

Claims priority, application United Kingdom, Nov. 29, 1972, 55181/72

Int. Cl. B24b *9/00*

U.S. Cl. 51—111 R **6 Claims**



1. In a grinding machine having a table for supporting a workpiece and defining a path of travel for the workpiece during grinding, grinding wheel mounting means drivably mounting two grinding wheels one on each side of said path of travel, and workpiece mounting means on said table and including means for setting the angle which a face of the workpiece makes with a plane containing its direction of travel during grinding whereby one wheel may be caused to work on said workpiece before the other wheel works thereon, the improvement comprising: said grinding wheel mounting means being independent of one another and each said grinding wheel mounting means being separately positionably adjustable in three senses, viz:

a. rectilinearly, parallel to the grinding wheel axis;

b. rectilinearly, transverse to the grinding wheel axis; and

c. rotationally, about an axis transverse to the grinding wheel axis and parallel to the said table.

3,874,123

METAL CONDITIONING PLANETARY GRINDER

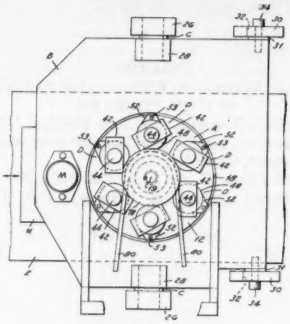
Richard G. Hopkins, Bennington Township, Shiswassee County, Mich., and Paul E. Stockhausen, Canfield, Ohio, assignors to MWA Company, Owosso, Mich.

Filed Oct. 11, 1973, Ser. No. 405,298

Int. Cl. B24b *7/00, 9/00*

U.S. Cl. 51—120 **7 Claims**

5. Grinding apparatus for grinding a workpiece comprising a head, support means supporting said head for rotation, means for rotating said head, a plurality of grinder units, means mounting said grinder units on said head in spaced relation to one another about the axis of rotation of said head, each grinder unit comprising a spindle extending generally parallel to the axis of rotation of said head, a grinding element on one end of each spindle, means for axially rotating said spindles, pivot means mounting said support means for pivotal movement about an axis transverse to the axis of rotation of



said head, and means for securing said support means in selected positions of pivotal adjustment.

3,874,124

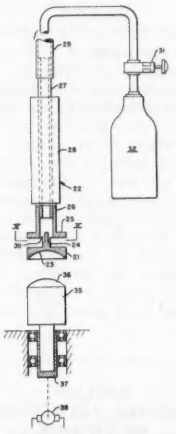
METHOD AND APPARATUS FOR MACHINING AND/OR POLISHING MOLDED ELASTOMER MATERIALS

Harry C. Morgan, 5821 Darlington Rd., Apt. 4, Pittsburgh, Pa. 15217, and Walter W. Weis, Jr., 226 Comrie Ave., Braddock, Pa. 15104

Continuation-in-part of Ser. No. 334,025, Feb. 20, 1973, abandoned. This application Mar. 21, 1974, Ser. No. 453,407

Int. Cl. B24b *13/02, 1/00*

U.S. Cl. 51—125 **51 Claims**



1. A method of machining and/or polishing an article, such as a contact lens or the like, of a molded elastomer to modify a surface of the article, said method including the steps of:

positioning said article upon the support surface of a carrier member;

reducing the temperature of said article in such a way so as to essentially increase the hardness of the molded elastomer forming said article;

establishing a liquid interface between a tooling surface and a selected surface of said article to undergo modification in such a manner so as to include forming a wetted liquid surface upon the article after the hardness thereof has been essentially increased by said reducing the temperature; the liquid interface being in a liquid state at normal atmospheric pressure and constituting a liquid having a

freezing point below the reduced temperature of the article;

modifying the selected surface of said article by the contact with a tooling surface while the selected surface remains wet with and in the presence of said liquid interface while maintaining said molded elastomer at a state of increased hardness by the continued reduced temperature thereof; and

allowing the temperature of said article to return to an ambient room temperature.

3. The product formed by the method of claim 1.

3,874,125
CONVERTIBLE PAD SANDER

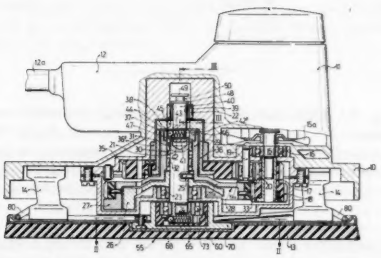
Reinhold Stroezel, Leinfelden, Germany, assignor to Robert Bosch GmbH,, Stuttgart, Germany

Filed Mar. 27, 1974, Ser. No. 455,286

Claims priority, application Germany, Mar. 31, 1973, 2316286

Int. Cl. B24b *23/00*

U.S. Cl. 51—170 TL **20 Claims**



1. In a pad sander, a combination comprising a housing; a pad movably coupled to said housing; drive means including a prime mover, an eccentric receiving motion from said prime mover and arranged to move said pad with respect to said housing, and control means operable to respectively convert the movement of said eccentric into orbital or reciprocatory movements of said pad; a pair of counterweights rotatable about a common axis to compensate for the imbalance of said pad while the pad performs said movements; and means for respectively rotating said counterweights in the same direction and in opposite directions when said pad respectively orbits and reciprocates with respect to said housing.

3,874,126
FLEXIBLE HAND HELD ABRADING TOOL

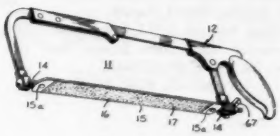
Robert T. Catlin, Trumbull; Chester H. Dawson, Danbury, and Philip R. Haskell, Easton, all of Conn., assignors to Remington Arms Company, Inc., Bridgeport, Conn.

Continuation-in-part of Ser. No. 189,786, Oct. 15, 1971, Pat. No. 3,774,355, which is a continuation of Ser. No. 803,561, March 3, 1969, abandoned. This application Nov. 23, 1973, Ser. No. 418,498. The portion of the term of this patent subsequent to Nov. 27, 1990, has been disclaimed.

Int. Cl. B24d *15/00, 11/00*

U.S. Cl. 51—393 **8 Claims**

1. An abrading tool comprising a flexible strip of hardenable and temperable steel having end portions and having, over at least a surface portion thereof, a strong, tough and adherent abrasive armoring coating produced in situ from abrasive particles of hard, high melting point, refractory metal-carbides, precoated with particles of a high melting and tough brazing metal selected from the group consisting of cobalt-base and nickel-base alloys and combinations thereof, said brazing metal particles being fusion bonded to each other and to said steel strip and alloyed therewith into weldments individual to and partially embedding said abrasive particles, with said abrasive particles projecting from said weldments to form



sharp cutting edges, and holder means for engaging the end portions of said strip and holding said strip under tension.

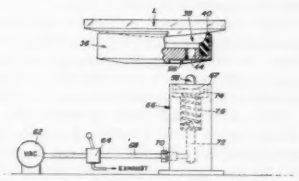
3,874,127
VACUUM CHUCK WITH SEALABLE CAVITY

Orin W. Coburn, and Joe D. Stith, both of Muskogee, Okla., assignors to Coburn Optical Industries, Inc., Muskagee, Okla.

Filed Jan. 3, 1973, Ser. No. 322,232

Int. Cl. B24b *41/06*

U.S. Cl. 51—216 LP **1 Claim**



1. An apparatus for inserting a plug into an aperture which in turn will seal an evacuated chamber formed by a lens blank and a blocking member wherein said plug is of a type having a domed head on one surface thereof and having a flat surface on the other surface thereof wherein said surfaces meet at a relatively thin periphery, a nipple extending from said flat surface and said blocking member having a second flat surface about said aperture wherein the improvement comprises,

a housing having an interior cavity leading to an annular upper edge and said edge adapted for positioning against said flat surface about said aperture,

a platform means reciprocally received within said cavity and normally disposed in a position at a distance from said edge an amount equal to the thickness of said domed head,

a spring means in said cavity for biasing said platform means to said position wherein said nipple extends into said aperture and said surface circumscribes the peripheral area about said aperture,

a vacuum source,

a conduit means for communicating said vacuum source with said interior cavity, and

a valve means located in said conduit means for selectively communicating said cavity to atmosphere or to said vacuum source and wherein said vacuum source is sufficiently strong to distort said periphery of said plug to thereby communicate the vacuum of said cavity to said chamber and said valve means interrupting said communication to the vacuum source and immediately exposing said cavity to atmospheric pressure whereby said distorted edge will be pressured snugly against said second flat surface.

3,874,128
CENTERLESS WORK-HOLDING APPARATUS FOR A MACHINE TOOL

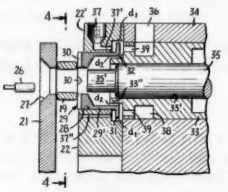
Katsutoshi Ishii, Ichikawa, Japan, assignor to Seiko Seiki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 30, 1972, Ser. No. 310,780

Claims priority, application Japan, Nov. 30, 1971, 46-112448; Nov. 30, 1971, 46-112447

Int. Cl. B24b *41/06*

U.S. Cl. 51—236 **3 Claims**



1. A centerless work-holding apparatus for a machine tool comprising, two rotatably driven rolls spaced radially to rotatably support individual workpieces sequentially disposed therebetween in a position radially relative to a reference axis passing through the individual workpieces and to engage the workpieces peripherally to rotatably drive them; means releasably clamping the workpieces individually in a position fixed axially of said reference axis and rotatably about said axis comprising a face plate disposed in a plane normal to said reference axis, a fluid-actuated, reciprocable, pressure-applying tubular rotor element actuated axially for engaging the workpieces individually and clamping them axially between it and the face plate; said rotor element having a flange at an end thereof remote from said face plate and a workpiece clamped between said rotor and said face plate; and means to selectively apply a fluid under pressure directly on one side of said flange for actuating said rotor element axially in a first direction for releasably clamping the workpieces individually and for applying said fluid under pressure directly on an opposite side of said flange for actuating said rotor element axially in an opposite direction to release the individual workpieces.

3,874,129
PROCESS FOR THE PRODUCTION OF HAZE-FREE SEMICONDUCTOR SURFACES

Helmut Deckert, Burghausen; Wolfgang Heinke, Od (Post Mehring); Herbert Jacob, and Helmut Kirschner, both of Burghausen, all of Germany, assignors to Wacker-Chemitronic, Postfach, Germany

Filed Sept. 25, 1973, Ser. No. 400,576

Claims priority, application Germany, Sept. 26, 1972, 2247067

Int. Cl. B24b *1/00*

U.S. Cl. 51—283 **1 Claim**

1. In a process for the production of a semiconductor having a haze-free polished surface by polishing the semiconductor with a polishing agent containing a substance selected from the group consisting of quarts, a silicic acid gels or sols, a silicate, a fluosilicate, and mixtures thereof, said substance having a particle size between about 5 and about 200 mμ the improvement which comprises further polishing the semiconductor in a second polishing step with a modified polishing agent containing said first polishing agent and from about 0.01 percent to about 0.5 percent by weight of polyvinyl alcohol calculated on the weight of said first polishing agent, and from about 1 percent to about 10 percent by volume of a saturated monohydroxy alcohol having from 3 to 5 carbon atoms, based on the volume content on said first polishing agent.

3,874,130
CEILING-MOUNTED APPARATUS FOR PROVIDING A SMOKE VENT OR SMOKEPROOF SCREEN IN THE EVENT OF A FIRE

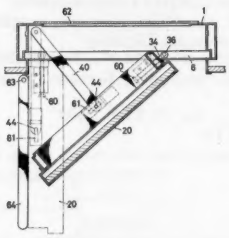
Mobuhiro Muramatsu; Kosuke Aoki, and Masamichi Miki, all of Shizuoka, Japan, assignors to Riken Lightmetal Industry Co., Ltd., Shizuoka-shi, Shizuoka-ken, Japan

Filed Apr. 10, 1973, Ser. No. 349,783

Claims priority, application Japan, Apr. 10, 1972, 47-35859; June 6, 1972, 47-66514; June 8, 1972, 47-67775; June 13, 1972, 47-69642

Int. Cl. E05f *15/20*

U.S. Cl. 52—1 **4 Claims**



1. An apparatus designed to provide a smoke vent or smokeproof screen, comprising an outer frame fixedly mounted on a ceiling to define a generally rectangular opening therethrough which extends between two opposite walls of an enclosed space under said ceiling, said outer frame having horizontally extending guide grooves formed on the confronting inside surfaces thereof; at least one cross-beam provided to said outer frame, said crossbeam also having horizontally extending guide grooves formed on both sides thereof; a lid normally closing said rectangular opening formed through said ceiling; support means openably supporting said lid at one end thereof and including a plurality of guide portions slidably received in said respective guide grooves of said outer frame and of said crossbeam; lock means for normally holding said lid in the closed position; a smoke detector for actuating said lock means; a plurality of turnable arms connecting said lid to said outer frame and to said crossbeam in such a manner that when said lock means is actuated to unlock said lid, the same is caused by gravity to move to the open position while its free end is caused to move substantially vertically downward as said guide portions of said support means slide along said respective guide grooves of said outer frame and of said crossbeam.

3,874,131
BUILDING CONSTRUCTION

John L. Webster, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va.

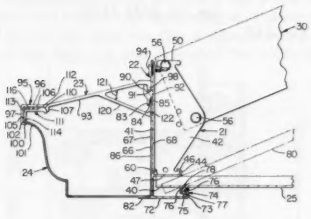
Filed May 3, 1973, Ser. No. 356,963

Int. Cl. F04d *13/00*

U.S. Cl. 52—11 **5 Claims**

1. A fascia having integral gutter and soffit supports comprising, a body portion having opposed surfaces and a top edge, a pair of rigid soffit supports each adjoining and extending transverse and in one direction from one of said surfaces, a gutter support extending from the other of said surfaces in a direction opposite from said one direction, and a T-shaped portion arranged in spaced relation from said gutter support at a location beneath said top edge, said T-shaped portion having a leg portion adjoining and extending from said other surface and having a pair of projections extending from the outer end of said leg portion in opposite directions, one of said projections extending toward said gutter support and being adapted to hold an upper portion of said gutter against said other surface and the other of said projections extending away

from said gutter support and being adapted to support a hanger for said gutter, said pair of soffit supports being defined as an upper and a lower flange having inner portions arranged in parallel relation and being adapted to receive a soffit therebetween, said lower flange having a roughly chan-



nel-shaped terminal end portion which is adapted to receive a resilient compressible member therewithin and said lower flange having an outer portion arranged substantially perpendicular to its inner portion with said channel-shaped portion adjoining said outer portion.

3,874,132

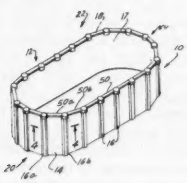
SWIMMING POOL LEDGE STRUCTURE

Robert Mendelow, Flushing, N.Y.; Arthur Schiff, Scotch Plains, N.J.; Abraham Silverman, Flushing, and Benjamin Stopek, West Hempstead, both of N.Y., assignors to Ideal Recreational Products, Inc., Sterling, N.J.

Filed Oct. 1, 1973, Ser. No. 402,373

Int. Cl. E04b *1/344*

U.S. Cl. 52—71 **24 Claims**



1. A ledge for a swimming pool having a side wall, a plurality of upright reinforcing posts, and a plurality of ledge segments, wherein the improvement comprises, each of said ledge segments having generally complementary first and second end portions each having upper and lower surfaces with the upper surface of said first end portion of each ledge segment and the lower surface of said second end portion having complementary male and female guide surface portions of predetermined configuration, the upper surface portion of one ledge segment being adapted to matingly engage the lower surface of an adjacent ledge segment, with said complementary surface portions thereof engaging each other in mating relation for preventing longitudinal movement of said ledge segments with respect to one another while allowing relative pivotal movement therebetween; means for pivotally interconnecting said ledge segments at said mating end portions to permit relative pivotal movement therebetween thereby to adjust the angular relation between said ledge segments, and separate means on the lower surface of said first end portion of the ledge segment for operatively interconnecting the first end portion of said ledge segments to their associated upright posts in a relatively fixed position whereby the position of adjacent ledge segment may be adjusted by pivoting the second end portion of the adjacent ledge segment with respect to the first end portion of an associated ledge segment.

3,874,133

SYSTEMS FOR INTERCONNECTING PLATES

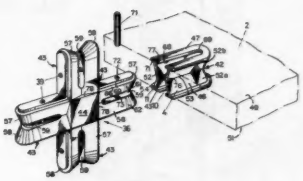
Arthur Aurelius Xaverius Silvius, Leerdamseweg 34, Asperen, Netherlands

Filed June 9, 1972, Ser. No. 261,426

Claims priority, application Netherlands, June 10, 1971, 7107973

Int. Cl. F16b *5/06*

U.S. Cl. 52—758 D **12 Claims**



1. A system for interconnecting relatively thin sheets to one another and to relatively thick panels and for interconnecting relatively thick panels to one another and to relatively thin sheets, comprising:

interconnecting means for fitting into slidable engagement with the relatively thick panels;

flange means extending from said interconnecting means for overlying opposite sides of the relatively thick panels to effect a tight fit between the panels and the interconnecting means; and

coupling means having a plurality of slot means therein, said coupling means slidably receiving said interconnecting means to secure the relatively thick panels to the coupling means, said slot means having a width approximating the thickness of the thin sheets and extending in the coupling means for receiving the thin sheets and retaining the thin sheets on the coupling means.

3,874,134

MODULAR BUILDING UNITS

Albert Feldman, 4 Upton Rd., and Robert Feldman, 27 Larnis Rd., both of Framingham, Mass. 01701

Continuation of Ser. No. 115,276, Feb. 16, 1971, abandoned, which is a continuation-in-part of Ser. No. 53,675, May 1, 1970, abandoned. This application May 29, 1973, Ser. No. 364,980

Int. Cl. E04h *9/06, 1/12*

U.S. Cl. 52—79 **15 Claims**

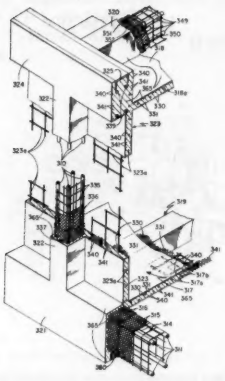
1. A cementitious building unit having at least a floor, two opposing walls and a ceiling, a continuous interior surface and a ribbed exterior, comprising:

a. framing elements for the floor, ceiling and exterior walls, said framing elements consisting of upper peripheral horizontal framing elements, lower peripheral horizontal framing elements, vertical framing elements extending between said upper and lower elements and intermediate horizontal framing elements extending between said peripheral horizontal elements:

b. at least one layer of wire mesh attached to said framing elements and extending over the interior surfaces of said framing elements so as to form the core for the floor, ceiling and exterior walls; provision being made in said framing elements and wire mesh layers for open portions, such as windows, doors, chimneys, conduit spaces and the like; and

c. a mass of cementitious material interspersed in and surrounding said wire mesh layers so as to form the floor,

ceiling and exterior walls as a continuous interior surface, with the forming elements forming exterior ribs; the portions of said floor, ceiling and walls which extend between said framing elements being thin.



3,874,135

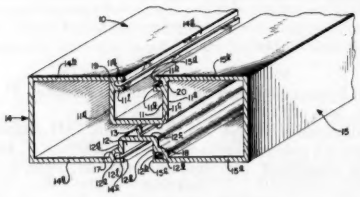
EXTRUDED METAL CONSTRUCTION ELEMENT

Eugene J. Craven, Rt. 1, Box 207, Moreland, Ga. 30259

Continuation of Ser. No. 283,082, Aug. 23, 1972, abandoned. This application Apr. 22, 1974, Ser. No. 462,802

Int. Cl. E04c *3/06*

U.S. Cl. 52—98 **6 Claims**



1. An integral elongated metal construction element having a generally rectangular hollow section comprising two external U-shaped parts, the legs of which extend toward each other in two spaced apart planes and are provided with spaced apart ends adapted to receive the edges of panel elements therebetween on opposite sides of said section, two oppositely facing internal U-shaped parts disposed within said section between said planes substantially at right angles to said external U-shaped parts and spanning the spaces between the legs of said external U-shaped parts to receive the edges of the panel elements therewithin, the legs of each of said internal U-shaped parts extending toward but being displaced from the adjacent leg ends of said external U-shaped parts, and a joining member connecting said two oppositely facing internal U-shaped parts integrally formed and extending longitudinally therewith, said joining member having a portion thereof adjacent each of said internal U-shaped parts which are of sufficient strength to retain the structural integrity or shape of said U-shaped parts and which portions are sufficiently weak that they may be readily removed from said construction element.

3,874,136

TELESCOPIC MAST STRUCTURE

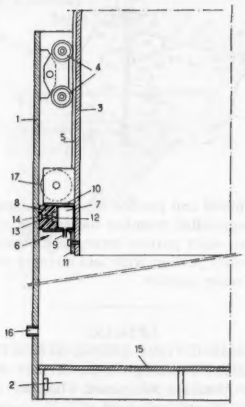
Lucien P. Michel, Paris, France, assignor to Scadella Anstalt, Vaduz, Liechtenstein

Filed June 7, 1973, Ser. No. 367,893

Claims priority, application France, June 12, 1972, 72.20997

Int. Cl. B66f *11/02*

U.S. Cl. 52—115 **3 Claims**



1. A telescopic mast structure comprising a plurality of tubular sections extendible one within the other, a guide unit adjacent one end of each section co-operable with a complementary surface of an associated tubular section, an expansible sealing joint adjacent the opposite end of each section and likewise co-operable with a complementary surface of an associated tubular section and means for introducing fluid under pressure into tubular sections whereby to extend and erect the structure, each expansible joint comprising an annular inflatable chamber extending around the tubular section, an annular resilient sealing member extending about the periphery of the inflatable chamber, and a lubricant cavity in the sealing member communicating through radial bores with the outer peripheral surface of the sealing member.

3,874,137

BUILDING ARRANGEMENT

Thomas H. Gentry, 404 Hilary Dr., Danville, Calif. 94920

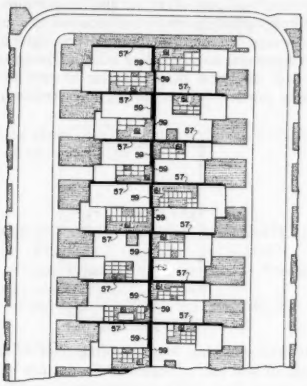
Continuation of Ser. No. 117,744, Feb. 22, 1971, abandoned, which is a continuation of Ser. No. 734,480, June 4, 1968, abandoned. This application July 9, 1973, Ser. No. 377,150

Int. Cl. E04h *1/02*

U.S. Cl. 52—169 **8 Claims**

1. A housing arrangement for a plurality of contiguous lots arranged in first and second rows, each lot in the first of said rows being arranged to have a common rear line with an aligned lot in the second of said rows, adjacent lots in each row having common edge lines therebetween and a front line facing a public street that is adapted to receive vehicular traffic, the edge lines of the first row being aligned with the edge lines of the second row, a house disposed in each of the adjacent lots of the rows, each house comprising vertical exterior walls enclosing a living area, each house being so positioned on its lot as to have a first generally solid vertical wall without apertures disposed along a common edge line and extending from one rear corner of the lot to the front of the living area and a second generally solid vertical wall without apertures extending along said rear line from said rear corner to that side of the living area remote from the first wall whereby said first exterior wall of each house disposed along

the edge line of its lot forms an enclosing wall for a courtyard or open area for the house on the adjacent lot of the same row, and whereby said second wall disposed along the rear line of the lot forms an enclosing wall for another courtyard or open area for one of the houses disposed on the opposed aligned lots of the second row, said last named houses of the second row each comprising vertical exterior walls enclosing a living area and so positioned on its lot that it has a first generally solid vertical wall without apertures disposed along at least a portion of a common edge line that is aligned with a common edge line of the first row and is spaced the width of the lot



from the first wall of the house on the opposed lot of the first row, each of said lots of each row having such courtyard or open area, each of said areas being bounded by a first wall of an adjacent house of the same row, by a second wall of an opposed house on an aligned lot of the other row and by said other vertical exterior walls of the house on the same lot, the other vertical exterior walls that enclose the living area of each such house being physically spaced from the first wall of the house on an adjacent lot to provide both said courtyard or area and also isolation between houses on adjacent lots of a row.

3,874,138

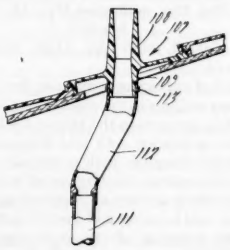
ROOFING SYSTEM

Harold A. Storch, 31819 Mayfair Ln., Birmingham, Mich. 48009

Division of Ser. No. 182,361, Sept. 21, 1971, Pat. No. 3,783,570. This application Aug. 22, 1973, Ser. No. 390,392

Int. Cl. E04f *17/02*; **E04d** *13/14*

U.S. Cl. 52—199 **2 Claims**



1. In combination, a fixed stack leading from a gaseous fluid source toward a roof and terminating below the roof, a planar roofing element having a tube integrally formed therewith and passing through and below the roof, and a flexible conduit secured to and interconnecting the lower end of said tube and the upper end of said stack, whereby movement of said tube with respect to said stack caused by roof movement will be permitted without creating leaks in said roof.

3,874,139

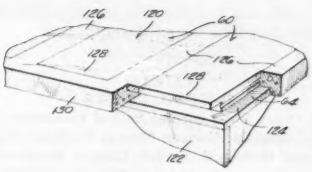
BASEMENT WALL CONSTRUCTION

Edmund A. Landwoski, Schofield, Wis. 54476

Filed Nov. 30, 1973, Ser. No. 420,426

Int. Cl. E04b *1/16*; **E04c** *1/12*

U.S. Cl. 52—251 **7 Claims**



1. A building wall construction having a footing arranged in the configuration of the building, a wall assembly comprising an array of first and second masonry panels supported on said footing and arranged in wall sections having end panels, each of said panels having an inside face and an outside face and oppositely located vertical side edges, said first panels having inside and outside flanges, said outside flanges extending from one of said side edges and being a continuous extension of said outside face, said inside flanges being a continuous extension of said inside face, and said second panels including flanges extending from said side edges and being extensions of said outside face of said second panels, said flanges projecting from said side edges a distance equal to the thickness of said panels less the thickness of said flanges to form vertical chambers between adjacent panels, and said flanges having an end surface and an inside surface and each of said panels having a dowel projecting from a side edge, said dowels being located to abut said inside surface of said flange of said adjacent panels of the same wall to align the wall sections in the same wall in a planar array with a continuous planar outer wall surface and said dowels in one of said panels adjacent a corner engaging a side edge of the other of said adjacent panels to align the end surface of said flange of said other of said panels with the outer surface of said one panel to form a continuous surface to the corner, each of said wall sections including at least one of said second panels to reverse the sequence of flanges of said first panels so that the end panels in each wall section have outside flanges projecting from said wall section to form corners with adjacent transverse wall sections.

3,874,140

STRUCTURAL WALL MEMBER WITH SCULPTURED SURFACE AND METHOD OF MAKING SAME

Donald G. Seehusen, Portola Valley, Calif., assignor to United States Rock Company, Inc., Sunnyvale, Calif.

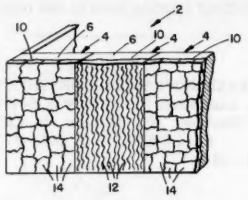
Filed Mar. 19, 1974, Ser. No. 452,597

Int. Cl. B44f *9/04*; **E04c** *1/00*

U.S. Cl. 52—315 **25 Claims**

1. A method for making a building panel having a decorative face comprising the steps of providing a form defining the outline of the panel, forming a flat bed of a loose granular material, placing the form onto the bed, giving an upper surface of the bed a sculptured configuration, thereafter placing onto the sculptured surface a mixture made from water, sand, a binding agent activated by the water and an adhesive com-

patible with and dispersable in water, permitting the mixture to set, thereafter filling the form with concrete, permitting the

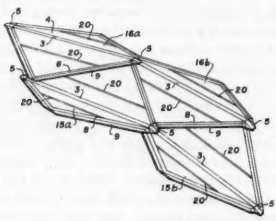


concrete to set, and removing the resulting panel having a sculptured surface from the mold and the bed.

3,874,141
BUILDING PANELS

Mervyn D. Olson; Roy F. Hooley, both of Vancouver; John Bell McRai, Coquitlam; Norman Murray Stephens, North Vancouver, and William R. Scotton, Ganges, British Columbia, all of Canada, assignors to International Canadome Limited, Burnaby, British Columbia, Canada

Filed June 8, 1973, Ser. No. 368,289
Int. Cl. E04b *1/32*
U.S. Cl. 52—630 **11 Claims**



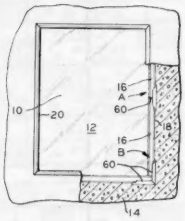
1. A building panel comprising symmetrical quadrilateral modular plate for cooperative use with similar plates in building construction, said plate being folded along two lines symmetrically spaced one on each side of a diagonal line of symmetry to form a central valley between said lines and two similar at least substantially triangular portions lying in intersecting planes disposed at equal angles to a plane of symmetry of the plate, and said plate having extension portions at the ends of said diagonal of symmetry, and extension portions being generally planar and including therein a continuous extension of said two lines, thus defining extensions of said central valley and the plane of each said generally planar extension portion being bent to define an acute angle with the diagonal line of symmetry, whereby said extension portions are shaped to lap with an extension portion of an adjoining plate on the building construction.

3,874,142
REGLET JOINT

John A. Dallen, Port Clinton, Ohio, assignor to The Standard Products Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 136,848, April 23, 1971, abandoned. This application Mar. 5, 1973, Ser. No. 338,389
Int. Cl. E04c *2/38;* **E04f** *1/56*
U.S. Cl. 52—656 **6 Claims**

1. A joint between adjacent end portions of a pair of reglets of the type including a substantially channel-shaped cross-sectional configuration defined by spaced-apart side walls and a bottom wall, said side walls having flanges extending outwardly therefrom, said flanges including bottom surfaces having longitudinally extending spline receiving recesses therein, said recesses having a width in the direction parallel to said flanges and having walls spaced-apart in the direction perpendicular to said flanges, and elongated metal splines received in said spline recesses for holding said adjacent end portions of said reglets together with said flanges substantially aligned, each of said splines having a longitudinal axis, a width corresponding to said recess width and a thickness dimension in said direction perpendicular to said flanges, said thickness dimension being substantially less than said width dimension and less than the spacing of said recess walls, and each of said splines having an intermediate portion bridging said adjacent end portions of said pair of reglets and leg portions extending from said intermediate portion and received in a corresponding spline recess, said intermediate portion extending across the spline transverse to said spline axis and being arcuate and offset in said direction perpendicular to said flanges, said intermediate portion further having ends transverse to said



spline axis and engaging corresponding ones of said spaced recess walls of said pair of reglets and a portion between said ends and spaced from said corresponding ones of said recess walls and engaging the other of said recess walls of said pair of reglets, each of said leg portions of said spline extending into the corresponding spline recess from the corresponding end of said intermediate portion and having a terminal end edge spaced from said corresponding end and engaging said one of said spaced recess walls of the corresponding spline recess, and each of said leg portions of said spline having a longitudinally arcuate curvature in said direction perpendicular to said flanges, said curvature being from said corresponding end of said intermediate portion to said terminal end edge, said curvature providing for said leg portion to be offset in said direction perpendicular to said flanges a distance greater than the spacing of said recess walls, whereby a portion of each of said leg portions between said corresponding end of said intermediate portion and said terminal end edge engages the corresponding one of said other of said recess walls.

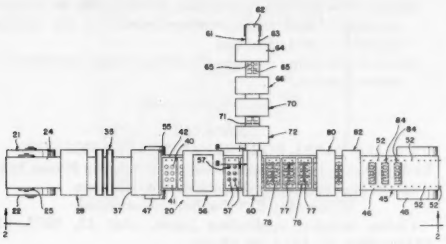
3,874,143
PACKAGING METHOD AND APPARATUS

Robert J. Braber, Harleysville, Pa., assignor to The Lehigh Press, Inc., Harleysville, Pa.

Continuation-in-part of Ser. No. 270,945, July 12, 1972, Pat. No. 3,811,564. This application Mar. 16, 1973, Ser. No. 341,867
Int. Cl. B65b *1/02, 43/08, 61/02*
U.S. Cl. 53—14 **7 Claims**

1. A method of packaging comprising feeding a sheet along a path, forming a blister in the sheet at one location along the path, depositing contents in the blister, feeding an additional sheet into facing relation with said first-mentioned sheet at another location along the path to extend across the blister and enclose the contents, scoring one of said first-mentioned and additional sheets to form a cut extending partially through said one sheet, and securing said sheets together in said facing relation along a region of closed configuration extending about said blister and score, whereby flexure of the secured sheets along said score effects severance of the score for opening therethrough and access to the contents further characterized in forming said blister by heating said first-mentioned sheet against a platen, withdrawing a section of the

platen from said first-mentioned sheet to provide an unsupported portion of sheet, and moving a forming die against the



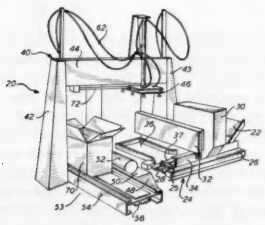
unsupported sheet portion and toward the withdrawn platen section to form said blister.

3,874,144

APPARATUS FOR TESTING AND EMPLACING FLEXIBLE SEALED PACKAGES

Harold J. Feigel, Teaneck, N.J., assignor to Neo-Dyne Industries, Inc., Linden, N.J.

Filed Mar. 19, 1973, Ser. No. 342,788
Int. Cl. B65b *57/00, 5/06*
U.S. Cl. 53—53 **11 Claims**



1. Apparatus for testing flexible packages and emplacing acceptable packages in a receiving receptacle, comprising in combination:

sealing state testing means for determining presence of defects in the sealing state of said package;

weight testing means for determining whether said package exceeds a pre-selected minimum acceptable weight;

means for receiving said flexible package and conveying said package to said sealing state testing means; and to said weight testing means;

means responsive to the said determinations at said sealing state and at said weight testing means, for rejecting a package found by either such means to be defective, and displacing such package from the processing stream of said apparatus;

means for accumulating a pre-selected number of packages determined to be acceptable by both said sealing state and said weight testing means, at a first location at said apparatus;

means for positioning a case to be loaded with a plurality of said acceptable packages, at a second location at said apparatus; and

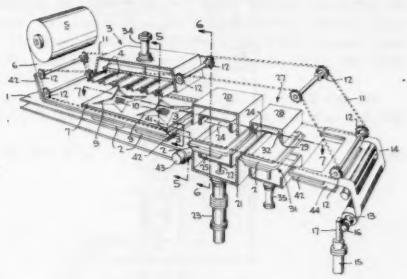
means for transferring said accumulated packages from said first location to said second location, and depositing said packages in said case.

3,874,145

COVERING- OR SEALING-APPARATUS FOR FOOD-CONTAINERS WHICH ARE FILLED, PREFERABLY, WITH FROZEN FOODS

Max Schmidt, Brauhausstrasse 17, 8800 Ansbach, Germany

Continuation-in-part of Ser. No. 150,996, June 8, 1971, abandoned. This application Aug. 7, 1973, Ser. No. 386,434
Int. Cl. B65b *31/02*
U.S. Cl. 53—112 R **11 Claims**



1. In an apparatus for covering and sealing with a thin, thermoplastic sheet, food-containers such as ready-for-sale food trays filled in particular with frozen foods, the apparatus being of the type comprising a serial-arrangement along a conveyor; a heating means and a heating zone for pre-heating the sheet in a region of the container to be heat-sealed; a sealing device downstream of said heating means and zone including complementary parts including means to seal the container to the sheet; and a punch-cutter device for separating unused marginal portions of the sheet surrounding the area sealing to the container; the improvement comprised in that: the sealing device includes a stationary first half and a complementary movably mounted second half, means for subjecting both the halves to the influence of vacuum and comprising correspondingly stationary and movably mounted first and second halves for forming a vacuum tank when sealing is effected; and the punch-cutter device includes a stationary first half and a complementary movably mounted second half.

3,874,146

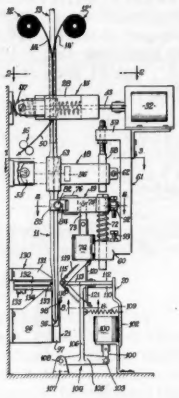
PACKAGING APPARATUS

Lucius D. Watkins, Hartland, Wis., assignor to Permtek, Inc., Naples, Fla.

Division of Ser. No. 169,439, Aug. 5, 1971, Pat. No. 3,785,556. This application Oct. 23, 1973, Ser. No. 408,811
Int. Cl. B65b *9/12*
U.S. Cl. 53—182 **3 Claims**

1. Apparatus for hermetically sealing, between opposing walls of a thermoplastic package, a gas-free body of liquid which is vaporizable at atmospheric conditions, said apparatus comprising means for forming a vertically elongated tubular package blank sealed along the bottom and lateral margins thereof, means for filling said blank with the liquid being packaged, means for controlling said filling means to maintain a predetermined head of liquid in said blank to control package size, means for heat-sealing said blank within an area spaced from the bottom margin of said blank and located in a part of said blank filled with liquid, means for severing said blank within said area, and means for avoiding vaporization of the liquid during heat-sealing by displacing the liquid in said blank from said area prior to heat-sealing and for maintaining the liquid in spaced relation from said area during heat-sealing, said means for avoiding liquid vaporization comprising means for engaging the opposed surfaces of the walls over a selected region which include said area and which extends above and below said area, and means for actuating said wall engaging means to press together opposing interior surfaces of

said walls in said selected region with sufficient pressure so as to eliminate liquid therebetween, and to maintain together the



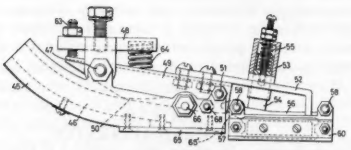
interior surfaces of said walls in said selected region during heat-sealing so as to retain the liquid being packaged in spaced relation to said area.

3,874,147

DEVICE FOR GUIDING AND/OR PRELIMINARY TIGHTENING OF CAPS IN AN APPARATUS FOR CLOSING JARS OR OTHER CONTAINERS WITH CAPS

Einar Zetterberg, Professorgatan 4B, 214 53 Malmoe, Sweden

Filed Jan. 24, 1973, Ser. No. 326,504
Claims priority, application Sweden, Jan. 24, 1972, 786/72
Int. Cl. B67b *3/20;* **B65b** *7/28*
U.S. Cl. 53—314 **4 Claims**



1. Apparatus for guiding caps in a device for closing containers comprising:

a conveyor for feeding filled containers through said device;

means for supplying caps to the device from a supply of caps;

means including a pair of spaced guide rails including a shoulder for guiding the caps to a junction where the caps are positioned on the container;

a pair of stop and guiding pins each having a cylindrical portion and a conical portion mounted

opposite to and spring biased toward each other and arranged to stop the caps from the cap supply with the stopped cap aligned for engagement by the container to be enclosed by said cap;

said guide rail shoulders terminating at a position along the spaced guide rails upstream of said stop and guiding pins so that upon engagement of the leading edge of a cap by a container, upper sides of the caps drop below the pin centerline to be in engagement with the lower conical and cylindrical surfaces on said pins to thereby force the container top on said container;

a pair of guide members located along opposite side edges of the caps as the container and caps advance beyond said stop and guiding pins;

a cam surface mounted to move concomitantly with said guide members against the action of a spring about a horizontal pivot axis extending across the direction of travel of said containers with their respective caps;

means including said cam surface for adjusting the vertical position of said guide members relative to the vertical position of said caps; and

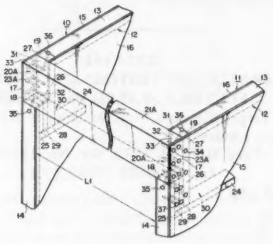
means for securing the caps which have been positioned on the containers.

3,874,148

WALL PANEL FOR PREFABRICATED HOUSING

Yoshiya Kato, Tokyo, Japan, assignor to Misawa Homes Institute of Research & Development, Tokyo, Japan

Filed May 8, 1974, Ser. No. 468,263
Claims priority, application Japan, May 12, 1973, 48-55729; May 12, 1973, 48-55732
Int. Cl. E04b *2/00*
U.S. Cl. 52—753 Y **7 Claims**



1. A wall panel for prefabricated housing comprising:

a frame work comprising a top horizontal frame member and an outside vertical frame member with the top end thereof separated from the end of the top horizontal frame member adjacent to said top end;

a pair of wall plates fixed to both lateral sides of said frame work and both frame member ends spaced from the corner of at least one of said wall plates;

a joint for receiving a horizontal member defined by said top end of the outside vertical frame member, said adjacent end of the top horizontal frame member and at least one of said wall plates.

3,874,149

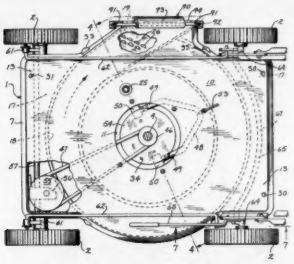
SELF-PROPELLED LAWN MOWER

Lester H. Seifert, R.R. No. 2 Park Ave., Kiel, Wis. 53042; Raymond P. Powers, 3515 N. 10th St., Sheboygan, Wis. 53081; William M. Schmidt, 35 Claireview Rd., Grosse Point Shores; Stanley E. Thorwaldsen, 286 Williams St., Grosse Point Farms, both of Mich. 48236; Frederick Smith, 247 Cambridge, Mt. Clemens, Mich. 48043; David McElroy, 22000 St. Gertrude, St. Clair Shores, Mich. 48081, and Roy P. Dunton, 37446 Charter Oaks, Mt. Clemens, Mich. 48043

Division of Ser. No. 289,539, Sept. 15, 1972, Pat. No. 3,802,170. This application Feb. 1, 1974, Ser. No. 438,590
Int. Cl. A01d *69/00*
U.S. Cl. 56—12.2 **3 Claims**

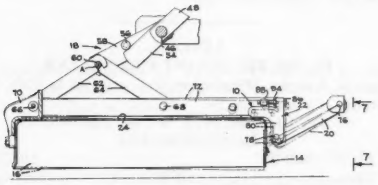
1. A rotary lawn mower, comprising a housing having a discharge outlet for the discharge of grass clippings, an engine mounted on the housing, cutting means located within the housing and operably connected to the engine, said housing including an upper housing member and a lower housing member spaced beneath the outer housing member to provide a substantially closed chamber therebetween, conducting means for conducting exhaust combustion gases from the engine to the chamber, said lower housing member defining a torus connected to the discharge outlet, and outlet means

connecting the chamber with the torus for discharging the exhaust gases from the chamber into the torus, said outlet



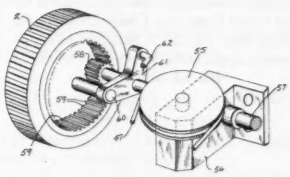
means being located above said torus and adjacent said discharge outlet and being arranged to direct said exhaust gases downwardly toward said discharge outlet.

3,874,150
IMPLEMENT LEVELING SYSTEM
David J. Boeck, Port Washington, Wis., assignor to FMC Corporation, San Jose, Calif.
Filed June 25, 1973, Ser. No. 373,584
Int. Cl. H01d *35/26*
U.S. Cl. 56—17.1 **2 Claims**



2. In a vehicle supported mower provided with a housing having a deck to which a cutter spindle is secured with a cutter on said spindle and with the cutter mounted for rotation in a cutter plane, and attachment means including a lift mechanism connecting the mower to the vehicle for movement between a lowered mowing position and a raised transport position, the improvement which comprises; a plurality of longitudinally and transversely spaced leveling pads on the deck of said mower housing and having their upper surfaces lying in a common reference plane disposed parallel to said cutter plane, said leveling pads being adapted to removably receive and support level detecting means selectively placed on different ones of said pads for determining when the reference plane is longitudinally and transversely level, leveling means for pivoting the mower about longitudinal and transverse axes until longitudinally and transversely level as indicated by the level detecting means, said attachment means including means defining a pair of transversely spaced parallelogram linkages, each having a pair of normally parallel arms and wherein said leveling means includes a pair of transversely spaced leveling devices attached to associated ones of said linkages and arranged when adjusted to pivot one arm of each of said parallelogram linkages slightly out of parallelism with its other arm thereby causing the mower to pivot about at least one axis relative to the vehicle until the reference plane is determined to be level, longitudinally extending mounting straps rigidly secured to the mower housing, each leveling device being adjustably secured between an arm of said associated parallelogram linkage and an associated strap for longitudinal sliding movement relative to said associated strap, and adjusting screw connected between said straps and said leveling devices for adjusting said devices, and means for locking said devices in adjusted position.

3,874,151
SELF-PROPELLED LAWN MOWER
Lester H. Seifert, R.R. No. 2, Park Ave., Kiel, Wis. 53042; Raymond P. Powers, 3515 N. 10th St., Sheboygan, Wis. 53081; William M. Schmidt, 35 Claireview Rd., Grosse Point Shores, Mich. 48236; Stanley E. Thorwaldsen, 286 Williams St., Mt. Clemens, Mich. 48236; Frederick W. Smith, 247 Cambridge, Mt. Clemens, Mich. 48043; David C. McElroy, 22000 St. Gertrude, St. Clair Shores, Mich. 48081, and Roy P. Dunton, 37446 Charter Oaks, Mt. Clemens, Mich. 48043
Division of Ser. No. 289,539, Sept. 15, 1972, Pat. No. 3,802,170. This application Feb. 1, 1974, Ser. No. 438,588
Int. Cl. A01d *35/12*
U.S. Cl. 56—17.2 **2 Claims**

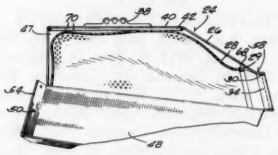


1. A self-propelled rotary lawn mower, comprising a housing having a discharge outlet for the discharge of grass clippings, engine means mounted on the housing, blade means located within the housing and operably connected to the engine means, a pair of first drive wheels, a horizontal first shaft carried by the housing and operably connected to said engine means, a pinion connected to an end of the first shaft, a gear mounted on one of said first drive wheels and engaged with the pinion whereby rotation of the shaft and pinion will rotate the first drive wheel, said pinion being spaced radially fron the axis of the first drive wheel, an axle to mount the first drive wheel for rotation about its axis, a crank arm pivotally connected to the shaft adjacent the first drive wheel, said axle being pivotally connected to one end of said crank arm, a pair of second wheels, a second shaft carried by the housing and connected to said second wheels, each end of the second shaft being provided with an offset crank portion terminating in a horizontal end that carries the respective second wheel, a connecting member interconnecting the second shaft and the opposite end of said crank arm, and actuating means for moving said connecting member to thereby simultaneously pivot said first wheels about the axis of said first shaft and pivot said second wheels about the axis of the central portion of said second shaft.

3,874,152
GRASS CATCHER UNIT FOR ROTARY LAWNMOWERS
Einar S. Dahl, Galesburg, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.
Filed Oct. 12, 1973, Ser. No. 405,831
Int. Cl. A01d *35/22*
U.S. Cl. 56—202 **11 Claims**

1. A rotary mower comprising a blade housing carrying a rotary cutter blade and having a grass clipping discharge outlet, a disposable collection bag for collecting grass clippings discharged from said outlet and having an inlet, a flexible carrier sack having an interior for carrying said collection bag and having a mouth connected to said outlet, and means

on said carrier sack in the vicinity of said mouth for engagement with said collection bag for maintaining said inlet open

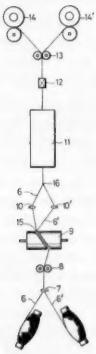


and for removably locating said collection bag in communication with said outlet.

3,874,153
METHOD OF AND APPARATUS FOR PRODUCING PARTIALLY BULKED YARN

Kentaro Kawasaki, and Keizo Takizawa, both of Osaka, Japan, assignors to Chori Company Limited, Osaka-shi, Japan

Filed Dec. 26, 1973, Ser. No. 427,491
Claims priority, application Japan, Dec. 28, 1972, 48-2550
Int. Cl. D02g *3/34*
U.S. Cl. 57—34 HS **3 Claims**



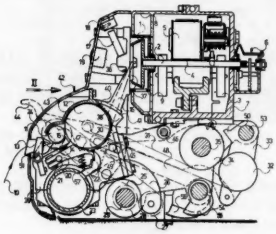
3. An apparatus for producing partially bulked yarn comprising a partial bulking mechanism comprising a fixed guide for bundling plural pieces of filaments, feed rollers, a filament guide roller having formed therearound a filament guide groove, fixed guides adapted to hold corresponding filaments emerging from said groove, a fixed guide for bundling said filaments, a heater, a false twisting spindle, and twisting means.

3,874,154
FIXEDLY DISPOSED FEEDING AND OPENING DEVICE FOR A SPINNING UNIT OF AN OPEN-END SPINNING MACHINE

Fritz Stahlecker, Bad Uberkingen, and Hans Stahlecker, Suessen, both of Germany, assignors to William Stahlecker GmbH, Geislingen Stiege, Germany

Filed Dec. 11, 1972, Ser. No. 313,617
Claims priority, application Germany, Dec. 11, 1971, 2161619.3
Int. Cl. D01h *1/12*
U.S. Cl. 57—58.95 **57 Claims**

1. Spinning machine arrangement comprising:
stationary supporting means,
feed roll means and opening roll means disposed in said supporting means,
spinning turbine means for spinning material supplied from the feed and opening roll means,
a single removable cover member for covering the turbine means and the feed and opening roll means when in a closed position,



cover mounting means for accommodating movement of said cover member from said closed position to an open position away from said turbine means and said feed and opening roll means, and
fiber duct means for guiding the material to be spun from said opening roll means to said turbine means, at least a portion of said fiber duct means being disposed on said support means in a housing surrounding at least a portion of said opening roll means.

3,874,155
FLAME-RETARDANT FIBER BLEND

William N. Knopka, Wilmington, Del., assignor to FMC Corporation, Philadelphia, Pa.

Filed Jan. 30, 1973, Ser. No. 328,043
Int. Cl. D02G *3/04*
U.S. Cl. 57—140 BY **10 Claims**

1. Flame-retardant yarns and fabrics of a combination of (1) fibers of a physical mixture of a polyester resin of at least 75 mol % ethylene-2,6-naphthalene dicarboxylate units and up to 25 mol % of other ester units and at least one organic bromine or chlorine containing compound having a total content of bromine, chlorine or mixture thereof of at least 40% based on the weight of the compound, the halogen compound being present in an amount sufficient to improve the flame-retardant properties of the mixture and (2) flame-retardant cellulosic fibers, the polyester fibers being present in an amount of from about 10 to 90 weight % and the cellulosic fibers being present in an amount of from about 90 to 10 weight %.

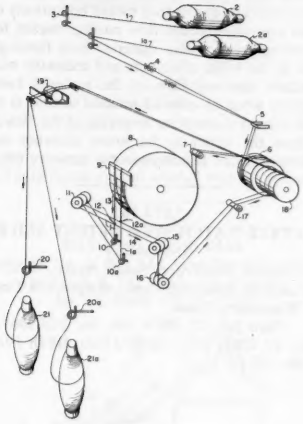
3,874,156
PROCESS FOR SIMULTANEOUSLY EDGE-CRIMPING AND FALSE-TWISTING YARN AND YARN PRODUCED THEREBY

Charles H. Hamby, Greenville, S.C., assignor to Deering Milliken Research Corp., Spartanburg, S.C.

Filed July 2, 1973, Ser. No. 375,806
Int. Cl. D02g *1/02, 1/10, 1/20*
U.S. Cl. 57—140 R **8 Claims**

1. A method for texturing a thermoplastic yarn to produce a textured torque yarn product consisting essentially of the steps of
a. heating a strand of the thermoplastic yarn;
b. passing the heated yarn in an acute angle and under tension about a single sharp edge;
c. inserting multiple turns of twist in the moving yarn downstream of the edge to a degree such that the twist applied to the yarn backs up in the yarn strand to the sharp edge;
d. allowing the yarn to cool;

e. removing the inserted twist from the yarn; and



f. thereafter collecting the textured torque yarn product.

2. A textured yarn which is produced according to the process described in claim 1.

3,874,157
FLAME-RETARDANT FIBER BLEND

William N. Knopka, Wilmington, Del., assignor to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 328,043, Jan. 30, 1973, and a Continuation-in-part of Ser. No. 328,044, Jan. 30, 1973. This application Aug. 3, 1973, Ser. No. 385,573
Int. Cl. D02g *3/04*
U.S. Cl. 57—140 BY **11 Claims**

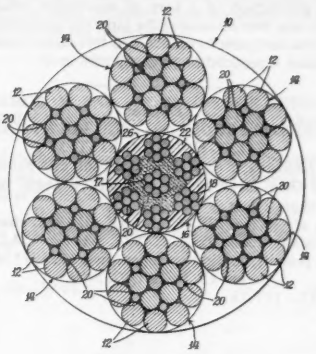
1. Flame-retardant yarns and fabrics of a combination of (1) fibers of a linear, random copolyester resin of at least 75 mol percent of ethylene-2,6-naphthalene dicarboxylate units and at least 3 mol percent up to 25 mol percent of a copolymerized ester unit having bromine or chlorine chemically united with the diol residue of said ester units in an amount sufficient to provide at least 3.5 percent of the halogen, based on the weight of the copolyester resin and (2) flame-retardant cellulosic fibers, the copolyester fibers being present in an amount of from 10 to 90 weight percent and the cellulosic fibers being present in an amount of 90 to 10 weight percent.

3,874,158
WIRE ROPE WITH PLASTIC IMPREGNATED LUBRICATED CORE

Ferdinand Chiappetta, and Fred Edgar Dykeman, both of Kenosha, Wis., assignors to Amsted Industries Incorporated, Chicago, Ill.

Filed Oct. 29, 1973, Ser. No. 410,812
Int. Cl. D07b *1/06, 1/16*
U.S. Cl. 57—149 **3 Claims**

1. A wire rope comprising: a lubricated core including a central strand and a plurality of outer core strands wound therearound; a flexible thermoplastic material filling the spaces between the outer core strands to retain the lubricant in the core, the thermoplastic material extending outwardly

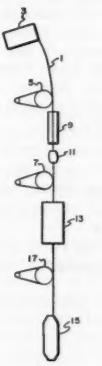


only to the outer diametrical limits of the core; and a plurality of strands wound around the core.

3,874,159
YARN PROCESS

Iain Mackay MacFarlane, Shelby, N.C., assignor to Fiber Industries, Inc., Charlotte, N.C.

Continuation-in-part of Ser. No. 110,985, Jan. 29, 1971, Pat. No. 3,708,970. This application Sept. 20, 1972, Ser. No. 290,675. The portion of the term of this patent subsequent to Jan. 9, 1990, has been disclaimed.
Int. Cl. D02g *1/02*
U.S. Cl. 57—157 TS **6 Claims**



1. In a process for simultaneously drawing and texturing by false twist crimping a synthetic multifilament yarn wherein undrawn or partially drawn yarn is fed into a simultaneous drawing and false twist crimping zone comprising a heated zone and false twist spindle positioned between a yarn feed means and a yarn draw means and wherein the false twist backs upstream into the heated zone and wherein the yarn necks at a draw point between the feed means and the false twist spindle, the improvement to reduce threadline tension along the longitudinal axis of the yarn between the false twist spindle and the draw means and thereby prevent or reduce filamentation caused by too high a threadline tension between said spindle and said drawing means when said yarn would be false twist crimped at the draw ratio and false twist insertion level used to conventionally flat draw said undrawn or partially drawn yarn at its optimum draw ratio and then false twist

crimp said drawn yarn, which comprises reducing the draw ratio, as determined by the peripheral speeds of the feed means and draw means, to a value allowing draw, false twist crimping production of a yarn of acceptable tenacity and dyeability, and then increasing the turns per inch of false twist inserted into said yarn to reduce said threadline tension until filamentation is reduced to an acceptable level.

3,874,160

PROCESS FOR PRODUCING HIGH BULKY YARN BY FALSE-TWISTING SYSTEM

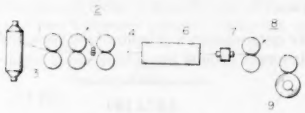
Shin-Ich Kitazawa, Kyoto; Takao Negishi, and Kozo Susami, both of Otsu, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Division of Ser. No. 239,462, March 30, 1972, abandoned. This application Jan. 14, 1974, Ser. No. 433,137

Claims priority, application Japan, June 17, 1971, 46-42947

Int. Cl. D02g *1/02, 3/04*

U.S. Cl. 57—157 TS **4 Claims**



1. A process for producing spun-like yarns by a false-twisting system comprising, in combination, forming a fibrous strand from at least two kinds of fibers having different melting point temperatures including adding to the fibrous strand a kind of fibers having a melting point temperature lower than a given temperature and which is dissolvable by a solvent that does not fully dissolve the fibers of the highest melting point temperature of said fibrous strand, said fibrous strand containing at least some short fibers, concurrently false-twisting, vibrating and heating said strand at said given temperature, said given temperature being between the highest and lowest melting point temperatures of said fibers, carrying out said step of heating without direct contact between said fibrous strand and any heating element, and, following said false twisting, removing at least some of said added kind of fibers by treatment with said solvent.

3,874,161

DEVICE FOR INDICATING USED PARKING TIME

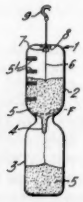
Kristoffer Asla, Hamar, Norway, assignor to Brodrene Asia A/S, Hamar, Norway

Filed Nov. 28, 1973, Ser. No. 419,545

Claims priority, application Norway, Nov. 28, 1972, 4348/72

Int. Cl. G04f *1/04;* **G07c** *5/02*

U.S. Cl. 58—1 R **11 Claims**



1. An irreversible-flow, "hour-glass" type timing device for measuring an elapsed time interval, comprising in combination:

a closed and at least partially transparent container;

said container comprising upper and lower chambers;

a quantity of flowable material in the upper chamber; and

a transition portion between the chambers for permitting communication therebetween and flow of the material from the upper to the lower chamber, the improvement comprising the transition portion including a one-way throttle flow passage means connecting the upper and lower chambers, said throttle flow passage means including means for preventing reverse flow of the material between said chambers when the chambers are inverted; and manually operable stop means operatively connected to said one-way throttle flow passage means for initially preventing the flowable material from flowing from the upper to the lower chambers and manually manipulated to initiate one-way flow of the material between the chambers when an elapsed interval of time is to be measured, whereby complete emptying of the flowable material from the upper to the lower chamber renders the device exhausted to subsequently measure elapsed time.

3,874,162

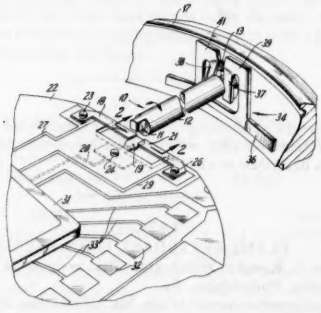
SOLID STATE WATCH STEM DETENT AND SWITCH ASSEMBLY

Raymond Robert Boxberger, South Nyack, N.Y., and Jack Schwartzschild, Stamford, Conn., assignors to Timex Corporation, Waterbury, Conn.

Filed July 22, 1974, Ser. No. 488,366

Int. Cl. G04c *9/00;* **G04b** *27/00;* **H01h** *19/00*

U.S. Cl. 58—34 **7 Claims**



1. A stem detent and switch assembly for a solid state digital watch with a circuit inside a case which comprises:

an elongated shaft, an eccentric tab at the interior end thereof, an intermediate rectangular section and an end portion projecting outwardly from the case,

a plurality of switch blades mounted for selective engagement with the eccentric tab to provide predetermined setting functions for the watch in cooperation with the watch circuit and,

a spring member engaging the rectangular section to provide a detent action and having a base portion biased against the case to provide electrical contact therewith.

3,874,163

LIQUID CRYSTAL DISPLAY TIMEPIECE WITH VARIABLE CONTRAST

Osamju Ikeno, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Oct. 2, 1973, Ser. No. 402,664

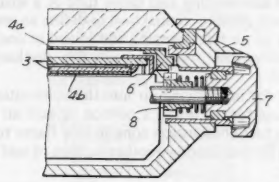
Claims priority, application Japan, Oct. 2, 1972, 47-114261

Int. Cl. G04b *19/30;* **G02b** *5/30, 27/28*

U.S. Cl. 58—50 R **6 Claims**

1. In an electronic timepiece including a field effect liquid crystal panel for display of the time, the improvement comprising a liquid crystal display panel having inner and outer faces, an inner fixed plane-polarizer sheet proximate the inner

face of said panel and an outer plane-polarizer sheet proximate the outer face of said panel, said outer sheet being



mounted for manual rotation within its plane whereby the contrast of said liquid crystal display may be altered.

3,874,164

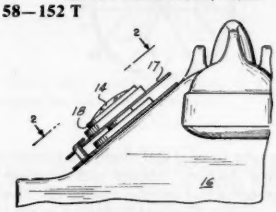
DAY-DATE-TIME DIAL

Eugene Bell, Rt. No. 1, Box 144, New Braunfels, Tex. 78130

Filed Oct. 9, 1973, Ser. No. 404,252

Int. Cl. G04b *37/12, 37/20*

U.S. Cl. 58—152 T **3 Claims**



1. In a day date time dial, the combination of a telephone receiver set that includes a rotatable dial for dialing telephone numbers, a center of said dial having a time piece mounted there upon, said time piece including a case enclosing a clock mechanism, a dial being located upon a front side of said case and enclosed by a transparent glass cover, said dial being graduated into minutes, a conventional hour, minute and second hand sweeping around a front of said dial face, said hands being operated by said clock mechanism, and a means being included around said time piece so to notify a person when a pre-determined time for telephone conversation is running out, said means including a singular arrow head and positioned directly over a front side of said clock case.

3,874,165

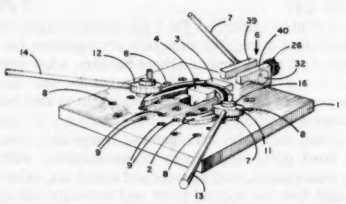
HORSESHOE SHAPING APPARATUS

William L. Dawson, 1888 Catalpa Trail, Las Vegas, Nev. 89108

Filed Apr. 15, 1974, Ser. No. 460,761

Int. Cl. B21k *15/02*

U.S. Cl. 59—56 **7 Claims**



1. Apparatus for bending a prefabricated horseshoe to conform to the contour of a horse's hoof comprising:

a rigid base,

holding means to mount a horseshoe in a fixed position relative to said base, and

bending means movable to a plurality of points around the inner and outer periphery of the horseshoe to exert bending force on the horseshoe.

3,874,166

METHOD OF AND APPARATUS FOR REDUCING HARMFUL EMISSIONS FROM INTERNAL COMBUSTION ENGINES

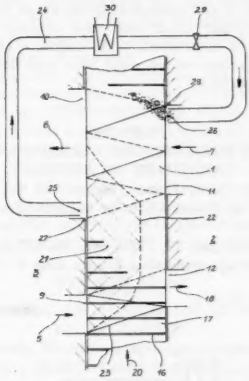
Hubert Kirchhofer, General-Guisanstr. 47, Nussbaumen; Josef Perevuznik, Hagelerstr. 71, and Alfred Wunsch, Im Eichtal 4, both of Baden, all of Switzerland

Filed Nov. 27, 1973, Ser. No. 419,275

Claims priority, application Switzerland, Nov. 29, 1972, 17373/72

Int. Cl. F02b *1/06*

U.S. Cl. 60—39.02 **11 Claims**



1. In the method of providing combustion air for an internal combustion engine by compressing the air in a gas-dynamic pressure-wave machine by utilization of heat still contained in the engine exhaust gases and wherein harmful emissions from the engine are reduced as a result of a primary recirculation of exhaust gas into the air at the interface between the exhaust gas and the air in the celled rotor of the machine, the amount of the exhaust-gas recirculation being at its lowest value at full load and increasing sharply with decreasing load, the improvement which comprises the step of introducing exhaust gas directly into the machine in at least one place at which the cells of the rotor are filled with air thereby effecting a secondary recirculation of the exhaust gas which increases at full load and which serves to render recirculation of the exhaust gas more uniform over the whole load range.

3,874,167

GAS TURBINE CONTROL WITH FUEL SHUT-OFF AND IGNITION UPON DECELERATION

Tetsuo Katsume, and Toshihiro Horiuchi, both of Yokosuka, Japan, assignors to Nissan Motor Company Limited, Yokohama, Japan

Filed Jan. 16, 1974, Ser. No. 433,790

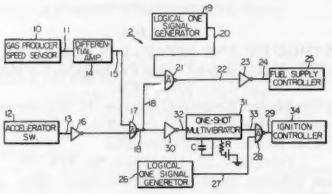
Claims priority, application Japan, Jan. 17, 1973, 48-7702

Int. Cl. F02c *9/04*

U.S. Cl. 60—39.28 R **2 Claims**

1. A control device for a two-shaft gas turbine engine responsive to the rotational speed of an engine gas producer shaft and the position of a manual engine speed control member;

said control device being operative to generate a fuel shut-off signal when said rotational speed is above a first predetermined value and said position corresponds to an engine speed below a second predetermined value indicating a deceleration demand condition of the engine;



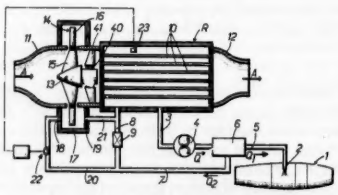
said control device being further operative to generate an ignition signal for a predetermined period of time after at least one of said rotational speed drops below said first predetermined value and said position is manually changed to correspond to an engine speed above said second predetermined value after said deceleration demand condition.

3,874,168

MEANS FOR THE IN-FLIGHT COOLING OF THE FUEL CARRIED BY AN AIRCRAFT

Kleber Toure, Paris, France, assignor to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France

Filed Jan. 29, 1974, Ser. No. 437,645
Claims priority, application France, Feb. 5, 1973, 73.03962
Int. Cl. F02c *9/10*
U.S. Cl. 60—39.28 R **8 Claims**



1. Means for the in-flight cooling of the fuel carried by an aircraft which is equipped with a fuel feed pump for supplying fuel to the engine and a return line so that under certain engine operating conditions at least part of the fuel delivered by said feed pump can be recycled to the suction side of the pump, said cooling means comprising a heat exchanger through which a coolant flows in thermal contact with the fuel to be cooled, means operable to accelerate the flow of coolant fluid through said heat exchanger, a hydraulic motor for driving said accelerating means and means for supplying said hydraulic motor with at least part of the fuel flow passing through the return line.

3,874,169

COMBUSTION CHAMBER FOR GAS TURBINES

Leif Andersson, and Laszlo Hunyadi, both of Finspong, Sweden, assignors to Stal-Laval Turbin AB, Finspong, Sweden

Continuation of Ser. No. 197,345, Nov. 10, 1971, abandoned.
This application Sept. 27, 1973, Ser. No. 401,440
Claims priority, application Sweden, Jan. 14, 1971, 383/71
Int. Cl. F02c *7/00*
U.S. Cl. 60—39.65 **2 Claims**

1. An axial flow combustion chamber for gas turbines and the like comprising:

a. a longitudinal flame tube having a circumferential wall, an air inlet opening at one end and a discharge opening at the other end;

b. a shell surrounding said flame tube at a spaced distance from said circumferential wall to define an annular jacket having an air inlet opening and joined at one end to said circumferential wall adjacent the discharge opening thereof;

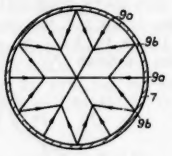
c. means for introducing air into the combustion chamber;

d. means for admitting a portion of said air into an upstream fuel combustion zone in said flame tube;

e. means for conducting another portion of said air into said jacket;

f. a plurality of apertures spaced circumferentially in the wall of said flame tube;

g. said apertures being located downstream from said fuel combustion zone for introducing air from said jacket into



said flame tube to cool and dilute the combustion gases prior to their discharge through said discharge opening;

h. a first group of said apertures being effective to direct streams of air in a direction radially towards the center line of the flame tube, and being spaced alternately between s second group of apertures, said second group of apertures comprising first and second apertures disposed at an essentially common circumferential location, and directed to effect a pair of oppositely circumferentially diverging streams with respect to a radius of the flame tube passing through said common circumferential location to intercept said radial streams at a spaced distance from the center line of the flame tube.

i. said pair of diverging streams having a relatively equal angle of divergence to produce a symmetrical flow pattern jointly with said radial streams at a spaced distance about the flame tube.

3,874,170

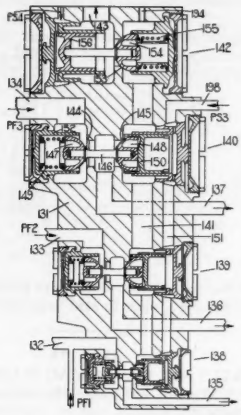
FUEL CONTROL APPARATUS FOR GAS TURBINE ENGINE REHEAT SYSTEMS

Geoffrey Arthur Lewis, Solihull, England, assignor to Lucas Aerospace Limited, Birmingham, England

Filed Apr. 6, 1973, Ser. No. 348,633
Claims priority, application United Kingdom, June 21, 1972, 28998/72
Int. Cl. F02k *3/10*
U.S. Cl. 60—241 **7 Claims**

1. A fuel control apparatus for a gas turbine engine reheat system, including a variable metering arrangement for controlling fuel flow to the engine reheat burners, a low pressure drain and a valve arrangement operable in one position thereof to connect said metering arrangement to said burners and in another position to connect said burners to said low pressure drain, said valve arrangement comprising first, second and third ports respectively communicating with said metering arrangement, said burners and said drain, valve seats between said first and second ports and between said second and third ports, a closure member movable to selectively engage said valve seats, means for biasing said closure member towards engagement with one of the seats, means responsive to a control pressure signal to move said closure member

against said biasing means into engagement with the other of said seats, a dump valve between said third port and said low



pressure drain, and means responsive to a further control pressure signal to open said dump valve.

3,874,171

EXHAUST GAS COMPOSITION CONTROL WITH AFTER-BURNER FOR USE WITH INTERNAL COMBUSTION ENGINES

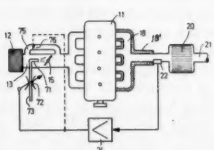
Peter Schmidt; Harald Kizler; Wolfgang Maisch, all of Schwieberdingen; Bernd Peter, Kornwestheim; Josef Wahl, Stuttgart; Ernst Linder, Mullacker, and Horst Neidhard, Korntal, all of Germany, assignors to Robert Bosch GmbH, Gerlingen-Schillerhohe, Germany

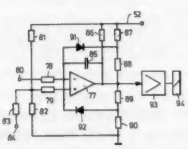
Filed June 2, 1972, Ser. No. 259,157

Claims priority, application Germany, Jan. 20, 1972, 2202614

Int. Cl. F02b *75/10*

U.S. Cl. 60—276 **17 Claims**





1. Exhaust gas composition control system to reduce the emission of noxious gases, for use with an internal combustion engine comprising the combination of

a thermo reactor (**19, 18'**) forming an after-burner to burn carbon monoxide and unburned hydrocarbons, connected to directly receive the exhaust from the engine and

a single catalyst catalytic reactor (**20**) of the reducing catalyst type connected downstream from the thermo reactor to receive the exhaust which has passed through the after-burner to reduce nitrogen oxides;

said system further comprising

an oxygen sensor (**22**) located between the after-burner and the catalytic reactor and to be exposed to the exhaust gas stream after having passed the after-burner, the sensor (**22**) providing an output signal exhibiting a sharp transition jump when the sensed gases change from oxydizing to reducing state, to provide a signal representative of presence, or absence of oxygen in the exhaust stream to which the sensor is exposed;

means (**25, 16, 72, 75, 76**) controlling the application of at least one component of the fuel-air mixture to the engine, connected to and controlled by the output signal from the sensor (**22**) and regulating the relative proportions of mass of air and fuel of the mixture applied to the engine such that the proportion is just slightly below the stoichiometric ratio of air and fuel;

and an integrating control amplifier (**24, 74**) having its input connected to the sensor (**22**) and its output connected to the control means (**25, 16, 72, 75, 76**), said control amplifier including an operational amplifier (FIG. 7: 77) connected as an integrating amplifier, and having its input connected to the sensor, circuit means (**87, 88, 91; 89, 90, 92**) forming a reference, and connection means connecting the reference to the input of the operational amplifier to clamp the maximum integrating level of the operational amplifier to the level of the reference.

3,874,172

FLUID PRESSURE REGULATOR VALVE AND SAFETY VALVE ASSEMBLY

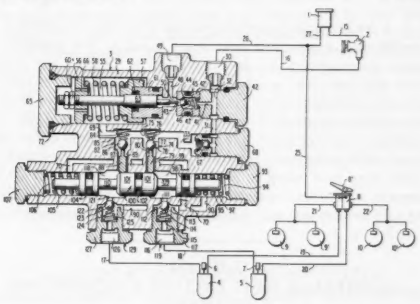
Naosuke Masuda, Higashi-Matsuyamashi, Japan, assignor to Jidosha Kiki Kabushiki Kaisha, Tokyo, Japan

Filed June 14, 1973, Ser. No. 370,187

Claims priority, application Japan, June 14, 1972, 47-059219

Int. Cl. F15b *20/00, 1/02*

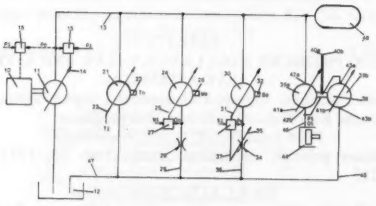
U.S. Cl. 60—403 **7 Claims**



1. A fluid pressure regulator valve assembly for a dual pressure hydraulic brake system having two independent brakd fluid conduits branching from a common supply passage connected to a source of pressurized fluid, said valve assembly comprising a pressure regulated valve connected to said common supply passage, each of said independent conduits being connected through an emergency valve to an accumulator, a check valve provided in said common supply passage, a one way check valve connected in each independent conduit, a slide valve common to both of said independent conduits and operatively connected to each of said emer-

gency valves, said slide valve being operable to urge said emergency valves to their open position during normal operating condition and a return passage in communication with said common supply passage at a point upstream of the dividing point of said two branching independent conduits, said return passage having a stop valve therein, said stop valve including a releasing means facing said stop valve and communicating with each of said accumulators, said releasing means being adapted to release and open said stop valve in response to a predetermined amount of pressure in either of said accumulators, wherein fluid pressure from each of said accumulators is normally applied to a respective one of the opposite sides of said slide valve through a respective one of fluid pressure introducing passages to retain the corresponding emergency valve in its open position and, when a loss of pressure is caused within either of said accumulators, said slide valve is moved in the direction to close the emergency valve connected to the accumulator having the loss in pressure, simultaneously fluid pressure from the other accumulator is applied to said releasing means, whereby a full pressure hydraulic braking operation is obtained utilizing the other accumulator maintained in normal operating condition.

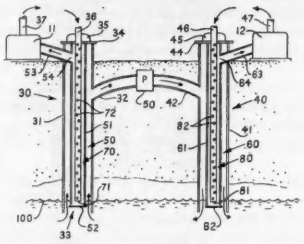
3,874,173
HYDROSTATIC POWER TRANSMISSION SYSTEM
Bernard Charles Wilkins, Henshaw Farm, Todmorden, Lancashire, OL146QR, England
Filed June 4, 1973, Ser. No. 366,669
Int. Cl. F15b *18/00*
U.S. Cl. 60—420 **7 Claims**



1. A hydrostatic power transmission system comprising in combination a reservoir containing liquid at low pressure, a prime-mover-driven pump controlled to deliver the liquid from the reservoir at sensibly constant higher pressure, a plurality of independent rotary variable-displacement hydrostatic motors controlled by integral feedback mechanisms, any number of independent linear hydrostatic motors controlled by power transformers, interconnected high-pressure conduits connecting said pump to said motors and said power transformers, and interconnected low-pressure conduits connecting said motors and said power transformers to said reservoir.

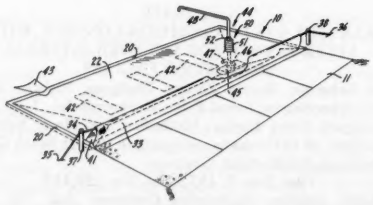
3,874,174
GEOTHERMAL HEAT EXCHANGE METHOD AND APPARATUS
Clarence Kirk Greene, 100 N. Arlington Ave., Reno, Nev. 89501
Filed May 6, 1974, Ser. No. 466,870
Int. Cl. F01k *27/00;* **F03g** *7/00*
U.S. Cl. 60—641 **8 Claims**

1. The method of generating power including: establishing two deep wells adjacent each other into a pool of hot brine beneath the earths surface; enclosing an heat exchange apparatus within each of said wells; circulating hot brine upward within one of said wells and thence downward within the other of said wells; causing vapor to be created within each of said heat exchange units by reason of heat from said hot brine; causing the said vapor so generated to be utilized to produce power by appropriate power generating means; condensing



said vapor during and after said power generation; and returning said condensed vapor to said heat exchange unit.

3,874,175
APPARATUS FOR CONTAINING WASTE MATERIALS
Raymond S. Winters, LaGrange, Ill., assignor to Environetics, Inc., Worth, Ill.
Filed Sept. 5, 1972, Ser. No. 286,566
Int. Cl. B65g *5/00;* **C02c** *3/00*
U.S. Cl. 61—.5 **16 Claims**



1. A waste containment means for collecting and containing waste materials comprising:
- means defining a pit area for containing liquid and solid waste materials having an inlet section adapted to receive said materials;
- cover means associated with and covering said pit area and acting in conjunction with the inlet section of said pit area to permit the entry of waste materials into said pit area and to restrain the escape of gases therefrom said cover means comprising a flexible membrane extending over the pit, in contact with the waste materials, said cover means being liquid and gas impervious;
- a layer of water overlying said cover means, said layer of water holding said cover means in contact with the waste materials thus cooling the waste materials;
- means to secure and suspend said cover means above said pit area; and
- waste material removal means associated with said pit area to remove waste materials therefrom.

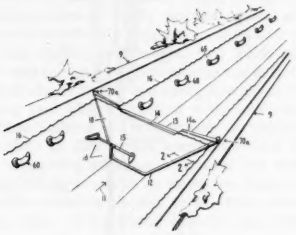
3,874,176
IRRIGATION CONTROL
Ralph E. Shettel, Rt. 1, Twin Falls, Idaho 83301
Filed Jan. 21, 1971, Ser. No. 108,434
Int. Cl. E02b *7/42*
U.S. Cl. 61—25 **13 Claims**

1. A balancing assembly for controlling the diversion of water in a channel comprising;
- dam means positioned in a channel means, the top surface of said dam means including a depression adapted to receive an opening spill segment,

pivot means permitting pivotal movement of said dam relative to said channel means,

seal means depending from the perimeter of said dam means for bearing against said channel means when said dam means is in the closed position,

control means for pivoting said dam means, attachment means secured to said dam means for attaching said control means thereto, said attachment means permitting



relative movement between said control means and said dam, one extremity of said control means extending downwardly from said attachment means to bear against the channel means for support and another extremity of said control means extending upwardly from said attachment means to permit the actuation of said control means to selectively space said dam means apart from the channel means.

3,874,177

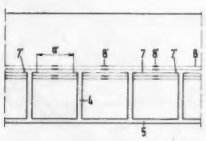
POCKET MAT

Jan Gerrit De Winter, Enschede, Netherlands, assignor to Nicolon B.V., Richtersweg, Enschede, Netherlands

Filed June 11, 1973, Ser. No. 369,063

Int. Cl. E02b *3/12*

U.S. Cl. 61—38 **5 Claims**



1. A mat for use in covering a slope or bank of a waterway comprising: a filtering web of woven, water-resistant, synthetic fabric, said fabric being permeable to water but impermeable to soil particles such as sand and earth, and a second web of woven synthetic fabric spanning said filtering web, said second web being narrower than said filtering web whereby one edge of said filtering web lies beyond the corresponding one edge of the second web across the span of the mat, the opposite edge of the second web being interwoven with the filtering web in a strip extending across the span of the mat, said second web also being interwoven with said filtering web in strips spaced across the span of the mat and extending from the first-mentioned strip to said one edge of said second web, thereby forming a series of pockets across the span of the mat which have open ends facing said one edge of the filtering web, whereby said mat can be disposed on a surface to be covered with the filtering web in contact therewith and with said pockets accessible from the exposed side of said mat and from locations intermediate the edges of said filtering web, and the unit number of those threads extending from edge to edge of the second web being lower than the like oriented threads of the filtering web whereby, with said webs interwoven as aforesaid, said second web will be bulged away from said filtering web to thereby increase the capacity of said pockets.

3,874,178

SUPPORT FOR MINE ROOFS AND THE LIKE

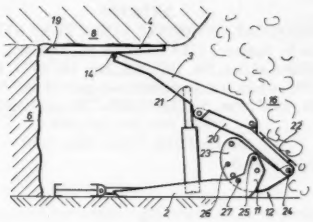
Heinz Kunzer, Herne, Germany, assignor to Bochumer Eisenhutte Heintzman & Company, Bochum, Germany

Filed Sept. 21, 1973, Ser. No. 399,504

Claims priority, application Germany, Sept. 22, 1972, 2246745.

Int. Cl. E21d *15/44*

U.S. Cl. 61—45 D **9 Claims**



1. A support for mine roofs and the like, comprising a base having a first side adapted to be closer toward and a second side farther from a mine face; an upwardly inclined shield having an edge region articulated to said base at said second side for pivotal movement about a first axis, and a spaced opposite free edge region; a roof member connected to said free edge region for movement about a second axis; a cylinder-and-piston unit having one end articulated to said base intermediate said sides, and an other end articulated to said shield intermediate said edge regions for pivotal movement about a third axis; means comprising a rigid element for varying the distance between said first and third axes, while maintaining unchanged the distance between said second and third axes; and means releasably connecting said element with said edge region of said shield so that said varying means may be used whenever required but can be removed when not needed.

3,874,179

SUBMARINE OIL STORAGE TANK SYSTEM

Nobuo Higashihara, Tokyo, Japan, assignor to Sumitomo Shipbuilding & Machinery Co., Ltd., Tokyo, Japan

Filed Mar. 6, 1973, Ser. No. 338,478

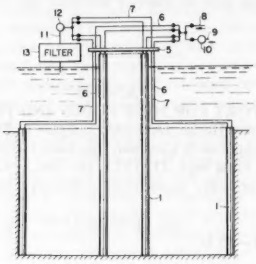
Claims priority, application Japan, Mar. 6, 1972, 47-22338; Mar. 6, 1972, 47-22339; Apr. 4, 1972, 47-41281

Int. Cl. E02b *17/00;* **B65d** *25/24*

U.S. Cl. 61—46 **3 Claims**

2. The submarine oil storage tank system as claimed in claim **1**, further comprising: a cleaning agent supply tank, means for fluid coupling said cleaning agent supply tank to said oil inlet and outlet connection for each tank, and an oil-water separating device fluid coupled to said sea water replacing pipe downstream of said tanks such that sea water

in passing to said oil inlet and outlet connection forces said cleaning agent to enter said tank, while the sludge and oil



contained in the cleaning sea water is separated therefrom prior to being returned to the sea.

3,874,180

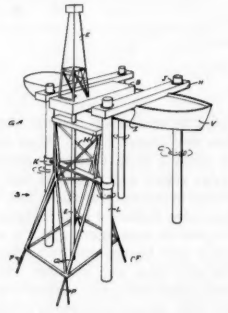
MODULAR OFFSHORE STRUCTURE SYSTEM

Maurice N. Sumner, 1718 Lubbock St., Houston, Tex. 77007

Division of Ser. No. 107,288, Jan. 18, 1971, Pat. No. 3,716,993, which is a continuation-in-part of Ser. No. 649,889, June 29, 1967, Pat. No. 3,575,005. This application Apr. 13, 1972, Ser. No. 243,790

Int. Cl. E02b *17/04;* **E02c** *5/00*

U.S. Cl. 61—46.5 **20 Claims**



1. An offshore marine structure founded on a marine floor comprising:

a platform at or above the surface of the water;

a footing member extending below the surface of the water to a point above and noncontiguous to the marine floor; and containing a plurality of means for guiding and holding pilings in a pile cluster in downwardly divergent bipodal array;

a piling, said piling being driven into the marine floor and; means rigidly connecting said platform and said footing member.

3,874,181

HIGH LOAD CARRYING CAPACITY, FREEZE AND CRACK-PROOF CONCRETE METAL PILE

Ivo C. Pogonowski, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

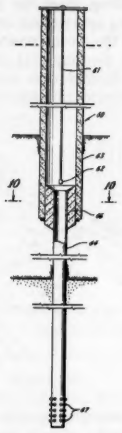
Division of Ser. No. 247,584, April 26, 1972, Pat. No. 3,795,035. This application Sept. 28, 1973, Ser. No. 401,778

Int. Cl. E02d *5/48, 31/12*

U.S. Cl. 61—53 **6 Claims**

1. A composite steel-concrete pile for resisting freezing water internally thereof comprising,

a. a pile comprising an upper concrete portion connected to a lower steel portion, and



b. a longitudinal resilient element extending internally of the concrete portion of the pile for the length required to be protected from the formation of ice blocks therein said pile concrete portion.

3,874,182

METHOD OF LAYING DRAINAGE TUBING

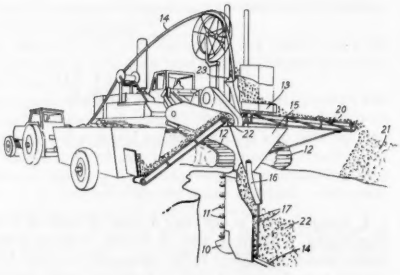
Ernest William Potter, Stansted; William Ratcliffe, and Ronald Noel Allen, both of London, all of England, assignors to Henry Sykes Limited, London, England

Filed Nov. 22, 1972, Ser. No. 308,872

Claims priority, application United Kingdom, Nov. 26, 1971, 55101/71

Int. Cl. B02f *5/06;* **F16l** *1/00*

U.S. Cl. 61—72.5 **2 Claims**



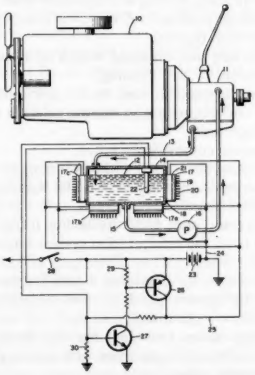
1. A method of laying generally horizontal wellpoint/drainage tubing for use in the dewatering of ground, comprising progressively excavating a slot-like trench having a width which is small in comparison with the depth of said trench by advancing a digging mechanism along a predetermined route to mechanically dig out spoil, said digging mechanism including a substantially vertically oriented endless chain having a series of cutters thereon, said endless chain and its cutters being driven along a closed path while said digging mechanism is advanced along said predetermined route thereby to bring said spoil to the top of said trench, said closed path having a length along said trench which is substantially smaller than the depth of said trench, supporting the sides of said trench as said excavating step proceeds by positioning a pair of vertically oriented horizontally spaced plates adjacent the sides of said

trench and by advancing said plates along said trench together with said digging mechanism, directing the spoil brought to the top of said trench in a lateral direction away from and to one side of the trench being dug to prevent at least the majority of the spoil removed from the trench from being returned to the trench, laying a continuous length of flexible, perforated tubing along the bottom of the trench by advancing a coil of said tubing along said predetermined route together with said digging mechanism and supporting plates and by progressively feeding said continuous length off said coil and through a substantially vertically oriented guide structure which is located between said supporting plates at a position rearward of said digging mechanism, said guide structure extending into said trench to a position adjacent to but spaced from the bottom of said trench and said guide structure being advanced along said trench together with said supporting plates to direct said tubing in a substantially vertical direction toward the bottom of said trench whereafter, at a location between said supporting plates and adjacent the bottom of said trench, the tubing bends to lie along the bottom of said trench, thereafter immediately and substantially completely backfilling the region of the trench between said supporting plates with a water-pervious material different from the spoil, said backfilling step being effected concurrent with the laying of said tubing by advancing a hopper containing said water-pervious material along said predetermined route together with said digging mechanism, supporting plates, coil of tubing, and guide structure and by discharging said water-pervious material from said hopper, into said trench and over and around the length of tubing emerging from said guide structure, through a discharge chute which extends from the hopper into the trench at a location between said supporting plates and rearward of said guide structure, and connecting the flexible tubing to suction pumping means, said digging mechanism, supporting plates, coil of tubing, guide structure, hopper, and discharge chute all being mounted in fixed position relative to one another on a common structure which is advanced as a unit along said predetermined route.

3,874,183
COOLING DEVICE FOR FLUID OF A MOTOR VEHICLE TRANSMISSION

Michael A. Tabet, Norfolk, Va., assignor to Hughes D. Burton, Norfolk, Va., a part interest

Filed Feb. 21, 1974, Ser. No. 444,679
Int. Cl. F25b *21/02*
U.S. Cl. 62—3 **6 Claims**

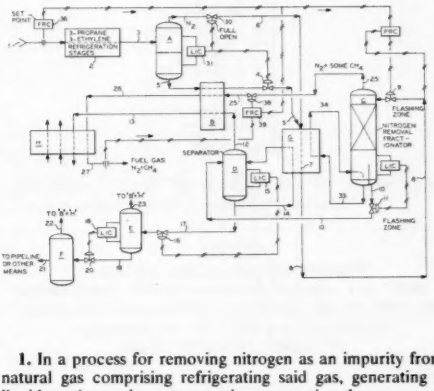


1. Means for cooling a fluid in a change-speed gear box comprising a reservoir for storage of a supply of said fluid, means for circulating fluid between the gear box and the reservoir, and means for withdrawing heat from the fluid in the reservoir comprising a thermoelectric heat pump.

3,874,184
REMOVING NITROGEN FROM AND SUBSEQUENTLY LIQUEFYING NATURAL GAS STREAM

Ernest A. Harper, and Martin R. Reber, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 24, 1973, Ser. No. 363,484
Int. Cl. F25j *3/02*
U.S. Cl. 62—28 **4 Claims**



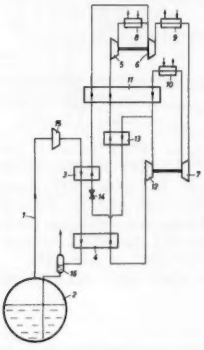
1. In a process for removing nitrogen as an impurity from natural gas comprising refrigerating said gas, generating a liquid portion and a vapor portion, separating the vapor and liquid portions from each other and further refrigerating the separated liquid portion in a first refrigeration zone, the improvement comprising the steps of

1. combining the thus refrigerated liquid portion with said vapor portion and cooling the combined portion in a second refrigeration zone under conditions to substantially liquefy the combined portion,
2. reducting the pressure of said substantially liquefied mixture obtained in step (1) to flash the liquefied combined portion into a vapor portion and a liquid portion and introducing the flashed mixture into a fractionation zone,
3. subjecting said flashed mixture to temperature and pressure conditions in said fractionation zone sufficient to separate substantially all of the nitrogen as a vapor overhead stream and a bottoms liquid stream substantially free of nitrogen,
4. passing said vapor overhead stream obtained in step (3) in heat exchange relationship with said separated liquid portion in said first refrigeration zone to cool and refrigerate said liquid portion,
5. passing a portion of said bottoms liquid stream obtained in step (3) in heat exchange relationship with said combined portion in said second refrigeration zone and returning same to a lower portion of said fractionation zone as a source of reboiling heat,
6. reducing the pressure of the remainder of said bottoms liquid stream obtained in step (3) to flash same into a vapor portion and a liquid portion and introducing the flashed stream into a separation zone,
7. removing a liquid stream from said separation zone and passing a portion of said stream in heat exchange relationship with said combined portions in said second refrigeration zone and returning same to an upper portion of said separation zone as reflux, and
8. removing a vapor stream from said separation zone and passing same in heat exchange relationship with said liquid portion in said first refrigeration zone.

3,874,185
PROCESS FOR A MORE EFFICIENT LIQUEFACTION OF A LOW-BOILING GASEOUS MIXTURE BY CLOSELY MATCHING THE REFRIGERANT WARMING CURVE TO THE GASEOUS MIXTURE COOLING CURVE

Volker Etzbach, Munich, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Aug. 31, 1973, Ser. No. 393,331
Claims priority, application Germany, Dec. 18, 1972, 2261886; Apr. 18, 1973, 2319803
Int. Cl. F25j 1/02
U.S. Cl. 62—40 9 Claims

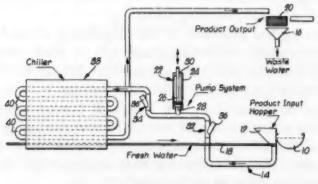


1. In a process for the liquefaction of a low-boiling gaseous mixture employing a closed refrigeration cycle wherein a cycle gas is compressed, cooled, expanded, and rewarmed by indirect heat exchange with the gaseous mixture to be liquefied, the improvement which comprises providing the lowest temperature required for the liquefaction of the gaseous mixture by warming in a heat exchange zone an isentropically expanded wholly gaseous first fraction of the cooled cycle gas and providing the remaining cold at a higher temperature level by vaporization in a heat exchange zone of the residual second fraction of the cycle gas which has been at least partially condensed by isenthalpic expansion.

3,874,186
PRODUCT CHILLING IN A FLUID CONVEYOR

James A. Bonuchi, Merriam, Kans., and J. D. Hawthorn, Independence, Mo., assignors to Gordon Johnson Company, Kansas City, Mo.

Filed Oct. 23, 1973, Ser. No. 408,862
Int. Cl. F26d 13/06
U.S. Cl. 62—63 10 Claims



1. In a method of processing food products, the steps of:

introducing the products into a conveying tube for transfer of the products therethrough;

introducing a fluid conveying medium into said tube for association with the products during their transfer;

applying a pumping force against the products and the medium simultaneously to advance the same on a first-in, first-out basis during said transfer with each product moving with its own pocket of the medium;

chilling the products with said medium while they are being transferred through the tube tube; continuing to transfer and chill the products within said tube until the temperature of the products first introduced into the tube has been lowered to a predetermined level;

discharging chilled products and medium from the tube;

precluding recirculation of discharged medium back into the tube with new products,

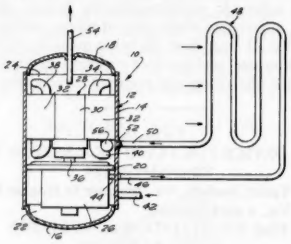
said pumping force application including moving all regions of a rigid surface against the medium through the same displacement and in reciprocal strokes; and

preventing transfer of medium and products in other than one direction through the tube during application of the pumping force.

3,874,187
REFRIGERANT COMPRESSOR WITH OVERLOAD PROTECTOR

Thomas J. Anderson, North Brunswick, N.J., assignor to Fedders Corporation, Edison, N.J.

Filed Apr. 26, 1974, Ser. No. 464,534
Int. Cl. F25b 1/00
U.S. Cl. 62—230 6 Claims



1. A compressor for a refrigeration system comprising:

a. a sealed housing having a compressor unit compartment in the lower portion and a motor compartment in the upper portion thereof;

b. a compressor unit disposed within said compressor unit compartment of said housing;

c. a motor disposed in said motor compartment of said housing and connected in driving relation ship with said compressor unit;

i. said motor comprising a rotor,

ii. and a stator provided with a winding having a bottom portion positioned adjacent to the bottom of said motor compartment;

d. a compressor inlet for introducing refrigerant gas discharged from the refrigeration system into said compressor unit;

e. conduit means for providing a path for the flow of compressed refrigerant gas from said compressor unit into said motor compartment;

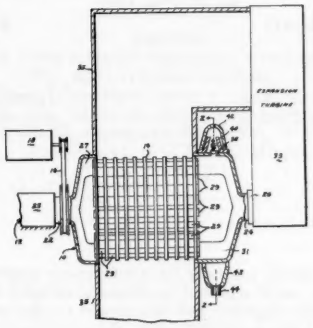
f. a housing outlet providing for the discharge of compressed refrigerant gas from said housing back to said refrigeration system;

g. and thermally operated switch means mounted adjacent to the bottom of said motor compartment and connected in electric circuit with said motor for disconnecting said motor from a source of potential when said switch means senses a temperature above a preselected value.

3,874,188
AIR CYCLE COOLING SYSTEM WITH ROTARY CONDENSING DEHUMIDIFIER

Eugene A. Zara, Dayton; Lawrence L. Midolo, Centerville, and William C. Savage, Xenia, all of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 9, 1974, Ser. No. 468,326
Int. Cl. F25d *21/00*
U.S. Cl. 62—272 **3 Claims**



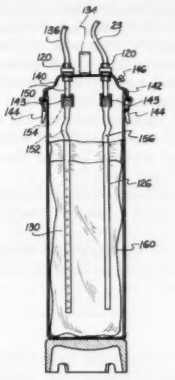
1. In an air cycle cooling system having an expansion turbine; a dehumidifier having a first air flow path and a second air flow path; means for supplying high pressure air to said first flow path; means for supplying air from the first flow path to said expansion turbine; whereby said air is cooled to a low temperature; means for supplying cooled air from said expansion turbine to the second flow path of said dehumidifier whereby the moisture in the air in said first flow path is condensed to form water; said dehumidifier comprising a transverse flow fan having a rotary fan member and an air duct surrounding the fan member; said fan member having a plurality of hollow vanes forming the first flow path within the vanes; said air duct forming the second air flow path through the rotary fan member external to the vanes; said rotary fan member having an end member for collecting water formed by the moisture condensed in the first flow path within said vanes; means, responsive the centrifugal force on the water in said end member for removing the water from said end member.

3,874,189
MACHINE FOR PRODUCING FROZEN CONFECTIONS

Thomas F. Calim, P.O. Box 158, Jackson Center, Ohio 45334

Filed May 2, 1973, Ser. No. 356,398
Int. Cl. B01f *3/04*
U.S. Cl. 62—306 **4 Claims**

1. A machine for dispensing soft ice cream or the like comprising, in combination, frame means; heat exchanger means for chilling a mix; a metering valve for sequentially dispensing portions of said mix from said heat exchanger means; a refrigerated storage compartment on said frame means; a pressurized mix tank mounted in said storage compartment and comprising a tank inlet and a tank outlet; a flexible mix bag removably mounted in said mix tank and including a sanitary bag interior sealed from said tank and a bag outlet; gas delivery conduit means for delivering a flow of gas to pressurize said mix and extending outwardly through said tank inlet to a source of pressurized gas; mix delivery conduit means communicating with said bag outlet means and extending outwardly through said tank outlet to said heat exchanger means; and

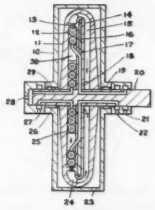


disconnect means in said conduit means for connecting and disconnecting mix bags to said conduit means.

3,874,190
SEALED SINGLE ROTOR TURBINE

Michael Eskeli, 7994-41 Locke Lee, Houston, Tex. 77042

Continuation-in-part of Ser. No. 410,985, Oct. 30, 1973,. This application Jan. 31, 1974, Ser. No. 438,239
Int. Cl. F25d *9/00*; **F28d** *11/00*
U.S. Cl. 62—401 **4 Claims**



1. A turbine for generating power and comprising:
a. a means for supporting shaft rotatably;
b. a shaft journalled in bearings in said support for rotation;
c. a rotating rotor mounted on said shaft so as to rotate in unison therewith, said rotor being adapted for high speed rotation, said rotor having first radially outwardly extending first fluid passageways with vanes therewithin for ensuring that said first fluid therewithin rotates at the same rotational speed as said rotor for effecting centrifugal compression and for effecting an elevated pressure; said first radially extending passageways having at their outward ends means for discharging said first fluid in forward direction which is in the direction of rotation; said first radially extending passageways being provided with heating heat exchanger near the outward ends of said vanes to add heat to said first fluid prior of its said discharge forward; said first radially extending passageways being provided with cooling heat exchanger to remove heat from said first fluid near the inward ends of said vanes for removing heat from said first fluid before and during early part of said compression; said first fluid being discharged from said forward discharge means to radially inward extending first fluid passages, with said inward extending passages having vanes therewithin for receiving the work associated with deceleration of said

first fluid; said inward extending first fluid passages outward ends being situated outwardly from said first fluid forward discharge means; said first fluid is then passed through passages to said first outward extending first fluid passageways; said heating heat exchanger being provided with with a second fluid with said second fluid entering and leaving said rotor via passageways near the center of said rotor; said cooling heat exchanger being provided with a third fluid with said third fluid entering and leaving said rotor via passageways near the center of said rotor;

d. a first fluid being circulated within said rotor with a predetermined amount of said first fluid having been sealed within said rotor;

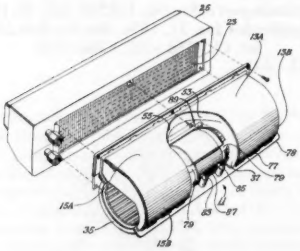
e. a second fluid being circulated within said heating heat exchanger in heat exchange relationship with said first fluid;

f. a third fluid being circulated within said cooling heat exchanger and being in heat exchange relationship with said first fluid.

3,874,191
BLOWER HOUSING

James N. Hudson, Fort Worth, Tex., assignor to Molded Products Company, Fort Worth, Tex.

Filed June 12, 1974, Ser. No. 478,635
Int. Cl. F25d *17/06*
U.S. Cl. 62—426 **6 Claims**



1. A housing for spaced apart cylindrical blowers located in axial alignment and driven by a motor located between the blowers for blowing air on the evaporator coil of an air conditioner, said blowers being coupled to shaft means of the motor on opposite sides thereof and having outer edges facing in opposite directions and inner edges facing each other, said outer and inner edges being located in planes transverse to the axes of said cylindrical blowers, said housing comprising:

a front wall, having top and bottom portions, extending across said housing to positions beyond the outer edges of said blowers,

top wall means extending rearward from the top portion of said front wall and which joins surrounding wall means extending around said cylindrical blowers from the lower portion of said front wall,

said front wall having an air egress region for each blower through which air may be blown,

each air egress region comprising an opening located at a level generally above its cylindrical blower,

curved baffle means located in said housing above and between said cylindrical blowers for directing air through said openings toward the central region of the evaporator coil,

said curved baffle means comprising curved walls located inward of said cylindrical blowers on each side of a plane extending midway between said blowers and which curved walls extend forward toward said front wall and curve toward each other, and

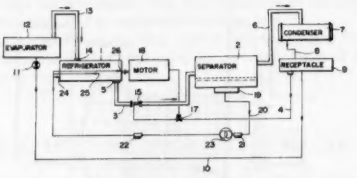
curved deflector means located in said housing above each cylindrical blower for deflecting air through said openings toward the central region of the evaporator coil,

said deflector means located above said blowers extending forward and curving toward said plane which extends midway between said blowers.

3,874,192
OIL COOLING APPARATUS FOR REFRIGERATORS

Eiji Kato, Chigasaki, Japan, assignor to Kabushiki Kaisha Maekawa Seisakusho, Tokyo, Japan

Filed Feb. 26, 1974, Ser. No. 446,005
Claims priority, application Japan, Feb. 27, 1973, 48-26610
Int. Cl. F25b *43/02*
U.S. Cl. 62—473 **6 Claims**

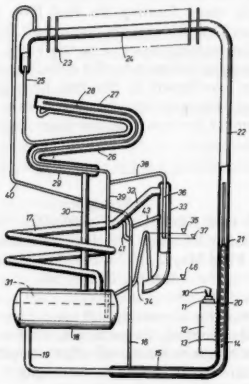


1. Oil cooling apparatus for a refrigerator comprising a refrigerator, an oil separator, an exhaust gas conduit for connecting said refrigerator and oil separator to each other, an atomization means provided within said conduit, and a liquid coolant supply source connected to said atomization means.

3,874,193
ABSORPTION REFRIGERATOR WITH ADDITIONAL MEANS FOR DEFROSTING THE REFRIGERATOR

Bengt Reistad Reistad, Bromma, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Mar. 4, 1974, Ser. No. 447,484
Claims priority, application Sweden, Mar. 2, 1973, 73029548
Int. Cl. F25b *15/10*
U.S. Cl. 62—490 **6 Claims**



2. In an absorption refrigeration apparatus having an inert gas and provided with a circuit for absorption liquid working medium, a gas circulation system including an evaporator and absorber, a vapor expulsion unit, a condenser connected to said vapor expulsion unit for delivering liquid to the evaporator to produce a refrigerating effect, the improvement comprising; a defrosting arrangement for said refrigeration appa-

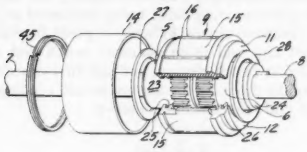
ratus having a vessel and wherein said gas circulation system is provided with a liquid seal in said vessel, said seal being temporarily open to permit the circulation of a gas and temporarily blocked during defrosting, a siphon for emptying said liquid seal in said vessel after said blocking period, a vent pipe conducting gas from the condenser, a first conduit connecting said vent pipe to said vessel, said first conduit functioning as a bubble pump by means of said inert gas being drawn from said condenser through said vent pipe, a second conduit connected to said vent pipe and conducting weak absorption liquid to said vent pipe, and a branch pipe connecting said second conduit to said absorber, said bubble pump being connected to said seal at a point higher than the inlet of said branch pipe to said absorber.

3,874,194

GEAR TYPE TORSION COUPLING WITH QUICKLY REPLACEABLE SLEEVE

Leslie Filepp, Colts Neck; James S. Jones, Westfield, and Charles Allia, Mercerville, all of N.J., assignors to Midland-Ross Corporation, Cleveland, Ohio

Filed Apr. 12, 1974, Ser. No. 460,561
Int. Cl. F16d *3/18*
U.S. Cl. 64—9 R **11 Claims**



1. A coupling for connecting a pair of end-to-end shafts comprising:

a pair of shaft hubs, each having external gear teeth around an end portion of its periphery, its opposite end portion being of smooth circular contour;

a sleeve with internal teeth in meshing relation with the teeth of both hubs, said sleeve comprising multiple sections having longitudinal edges abutting along multiple radial parting planes, and having flange means at each end extending radially inwardly beyond said internal teeth;

a cylindrical shell extending tightly over the outer cylindrical surface of said sleeve holding said sections in tight engagement along said planes;

retaining means in radially raised and fixed relation with the periphery of opposite end portions of the sleeve adjacent opposite ends of the shell for axially confining said shell on the sleeve between said portions, said retaining means on one of said portions being removable to enable disassembly of said shell and said sections.

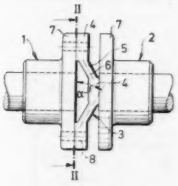
3,874,195

SHAFT COUPLINGS

Heinz-George Symann, Dortmund-Brackel, Germany, assignor to Kupplungstechnik GmbH, Westphalia, Germany

Filed Oct. 18, 1973, Ser. No. 407,444
Claims priority, application Germany, Nov. 25, 1972, 2257903
Int. Cl. F16d *3/17*
U.S. Cl. 64—11 R **1 Claim**

1. A coupling for connecting two shafts, comprising opposed flanges carried by adjacent ends of the two shafts, at least two resilient coupling members, each coupling member being substantially rectangular in shape and having at each corner a separate substantially rectangular boss with a hole and elongated bridge elements interconnecting said bosses, said bridge elements being rectangular in cross section and being substantially narrower than said bosses, said flanges having a plurality of holes, the holes of said flanges being in alinement with the holes of said bosses, said two coupling members being located in alinement with each other between said flanges, two alined holes of two bosses of the two coupling members being in alinement with a hole of one of said flanges,



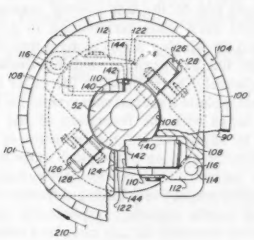
the following holes of the following bosses of the two coupling members being in alinement with a hole in the other one of said flanges, said bridge elements extending at an inclination to the axes of the two shafts, and means connecting the holes of said flanges with the alined holes of said bosses, wherein the cross-section of each bridge element is non-uniform, tapering gradually to a minimum cross-section in a central portion of the element intermediate its ends.

3,874,196

ROTARY DRIVE AND JOINT BREAKOUT MECHANISM

Robert W. Hisey, Richardson, and Larry E. Halwas, Garland, both of Tex., assignors to Gardner-Denver Company, Quincy, Ill.

Filed July 16, 1973, Ser. No. 379,664
Int. Cl. F16d *3/06*
U.S. Cl. 64—23.5 **10 Claims**



1. A rotary drive arrangement for rotating a drill stem on an earth drilling rig comprising:

a member disposed for rotation on said drilling rig and including an opening in which said drill stem is disposed for longitudinal movement with respect to said member; said drill stem comprising at least one elongated drill pipe section having a pair of opposed recesses in the outer wall surface of said drill pipe section, each recess forming a drive surface extending inward from the intersection of said recess with said outer wall surface generally toward the longitudinal axis of said drill pipe section, said drive surfaces extending longitudinally over a major portion of the length of said drill pipe section; and,

a pair of drive rollers engageable with said drive surfaces for rotating said drill pipe section in response to the rotation of said member, said rollers being disposed on support members which are mounted on pivot means on said member so that said rollers may be pivotally moved into and out of engagement with said drive surfaces.

3,874,197

MACHINE AND METHOD FOR THE CIRCULAR KNITTING OF PLUSH GOODS

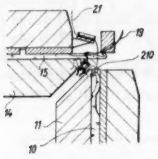
Ernst-Dieter Plath, Tailfingen, Germany, assignor to Mayer & Cie., Tailfingen, Germany

Continuation of Ser. No. 878,646, Nov. 21, 1969, abandoned. This application Apr. 6, 1972, Ser. No. 241,798

Claims priority, application Germany, Dec. 24, 1968, 1816864

Int. Cl. D04b 9/12

U.S. Cl. 66—12 5 Claims



1. In a multiple system circular knitting machine for manufacturing plush knitted fabric with spring needles disposed around a cylindrical needle bed and latch needles disposed around a dial bed, said spring needles are guided along different cam paths of cam systems in said circular knitting machine, the cam paths of the cam systems for the spring needles have special cam elements which are offset with respect to each other in the direction of rotation of the circular knitting machine, said latch needles and spring needles coacting to knit said plush fabric according to a predetermined pattern, the improvement comprising a special configuration for all spring needles, wherein each spring needle has an upper hook end and a shank extending downwardly therefrom and provided with an innermost portion extending parallel to the axis of the cylindrical needle bed along a straight line which extends from the shank upwardly past the upper hook end of each spring needle, said upper hook end being situated beyond said straight line on the side thereof opposite from the cylinder axis and each hook terminating in a downwardly directed inclined tip which extends along a line which makes with the straight line extension of said innermost portion of said shank a relatively sharp angle on the order of 5° to 15°, said cam systems include a special cam system for forming and holding plush loops with the formation of the plush loops being effected by adjustable stitch cam means of said special cam system while the holding of the plush loops is effected by stationary cam means of said special cam system, said latch and spring needles respectively having different distributions in said dial and needle cylinder, respectively, and stripping means operatively mounted in said circular knitting machine for assuring the displacement of the formed plush loops from the region of the needles and hooks.

3,874,198

APPARATUS FOR REGULATING PULSATORY OPERATION OF AN ELECTROMAGNET IN A CIRCULAR KNITTING MACHINE

Ivo Kouklik, and Jaroslav Lorenc, both of Trebic, Czechoslovakia, assignors to Elitex, Zavody testilniho strojirenstvi generalni reditelstvi, Liberec, Czechoslovakia

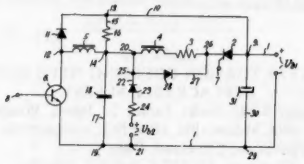
Filed Apr. 24, 1972, Ser. No. 246,791

Claims priority, application Czechoslovakia, Apr. 30, 1971, 3135-72

Int. Cl. D04b 15/78

U.S. Cl. 66—50 R 8 Claims

1. Apparatus for regulating the operation of the electromagnetic means for selecting the knitting instrumentalities of a circular knitting machine comprising a source of D.C. current for said electromagnet having a winding and a core, a pulse actuated switch interposed between said source and said electromagnet, and control means for regulating the flow of current through the winding of said electromagnet comprising an integrated circuit for causing a rapid current rise in the winding of said electromagnet on actuation of said switch by a pulse comprising a resonant circuit consisting of the resistance of the winding of the electromagnet, the inductance of the electromagnet and the capacitance of a first capacitor connected therewith, said pulse actuated switch element being connected in parallel across said electromagnet and said first capacitor means for thereafter maintaining on deactivation of



said switch a constant current on said winding for a predetermined interval comprising a second D.C. current supply, an adjustable resistor, and a separating diode serially connected therewith, said second D.C. current supply, said adjustable resistor and said separating diode being connected in parallel across said resonant circuit between a point between said electromagnet and said pulse actuated switch and a point between said first switch element and said first capacitor and means for rapidly dropping the current in said winding on the expiration of said predetermined interval.

3,874,199

LATCH NEEDLE FOR KNITTING MACHINES

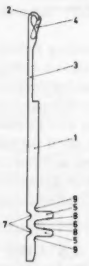
Harald Mayer, and Hardo Berentzen, both of Ebingen, Wurttemberg, Germany, assignors to Theodor Groz & Sonne and Ernst Beckert Nadelfabrik Commandit-Gesellschaft, both of Wurttemberg, Germany

Filed June 11, 1973, Ser. No. 368,918

Claims priority, application Germany, June 19, 1972, 2229858

Int. Cl. D04b 35/04

U.S. Cl. 66—121 4 Claims



1. A latch needle for knitting machines stamped from flat steel strip comprising;

a planar elongated needle shank having hook means disposed on one end;

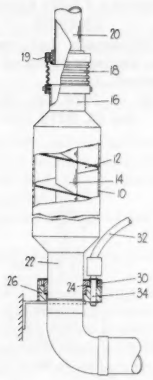
closely spaced parallel planar foot portions integrally formed with said needle shank adjacent the opposite end of said shank and projecting from one edge of the latter, engageable by cams of the knitting machine; a gap defined between said parallel foot portions; said shank further including a pair of recesses in an edge opposite to that which carries said foot portions, said

recesses being disposed substantially opposite to and in line with the longitudinal axes of said foot portions, the axes being substantially perpendicular to the longitudinal axes of said shank, said foot portions having respective outer termination edges, and wherein further recesses are provided in said needle shank at said termination edges, said further recesses extending below said one edge of the shank.

3,874,200
TAKE DOWN APPARATUS FOR CIRCULAR KNITTING MACHINES

Gillies Wood, 44 Ingarsby Dr., Evington, and John Michael Klee, 141 Lutterworth Rd., Leicester, both of England

Continuation-in-part of Ser. No. 167,264, July 29, 1971, abandoned. This application Jan. 19, 1973, Ser. No. 325,105
Claims priority, application United Kingdom, Aug. 6, 1970, 38339/70
Int. Cl. D04b *15/92*
U.S. Cl. 66—149 S **11 Claims**

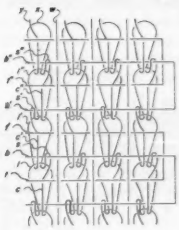


1. Airflow take-down apparatus for a rotatable cylinder circular knitting machine, comprising take-down duct means that comprises an entrance portion and an exit portion that are coaxial with one another and an intervening tortuous passageway having imperforate walls and presenting a continuous and uninterrupted throughway for continuous free passage of fabric therethrough, said passageway having such configuration and length that the shortest distance from said entrance portion to said exit portion through said throughway is substantially greater than the direct axial distance between the entrance and exit portions of said duct means, means for mounting said duct means with the said entrance portion and exit portion coaxial with the axis of a circular knitting machine, means for bodily rotating said duct means in synchronism with rotation of the cylinder of the circular knitting machine and a stationary airflow tube connected with said exit portion for conducting airflow from said passageway to continuously draw said fabric therethrough during the knitting of a length of fabric and to draw off a length of fabric when completed, whereby said tortuous passageway provides space for accommodating a length of fabric and said airflow continuously tensions the fabric as it is being knit and accommodated in said tortuous passageway and draws off a length of fabric when it is completed.

3,874,201
KNIT FABRIC INCORPORATING A FANCY WARP STITCH WEAVE

Kurt W. Niederer, Charlotte, N.C., assignor to W. Schlafhorst & Co., Monchengladbach, Germany

Filed Dec. 10, 1973, Ser. No. 423,485
Int. Cl. D04b *23/08*
U.S. Cl. 66—193 **5 Claims**

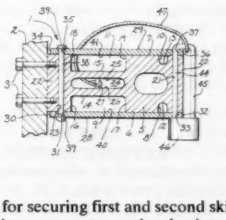


1. In warp knit fabric incorporating an inlay of spaced warp ends with filling ends laid at opposite sides of said warp ends and warp stitch chains running in the spaces between said warp ends, the improvement which comprises an arrangement of the loops of said stitch chains so that they pass outside of all filling ends at one side of said warp ends and inside all filling ends at the other side, with connecting segments between said loops running outside of any filling end at said other warp end side adjacent the loop throat and outside any intervening filling end at said one warp end side and then forming a sub-loop portion at the loop bight that wraps from inside out around any adjacent filling end at said other warp end side before connecting with the next succeeding loop.

3,874,202
SKI SUPPORT AND LOCK

Raymond H. Effenheim, 6551 W. Carolawn Dr., Brown Deer, Wis. 53209

Filed July 13, 1973, Ser. No. 378,959
Int. Cl. E04b *73/00*
U.S. Cl. 70—58 **5 Claims**



1. An apparatus for securing first and second ski equipment members, comprising a support member having a first outer surface providing a first opening and a second outer surface providing a second opening with said first and second surfaces located on opposite sides of said support member and said first and second openings receiving said first and second ski equipment members, respectively, first and second securing members having first and second rotating surfaces, respectively, pivotally connected to said support member, said first rotating surface rotatable in a plane substantially parallel to said first outer surface and said second rotating surface rotatable in a plane substantially parallel to said second outer surface, and latching means releasably engaging said support member and said first and second securing members for selectively securing said first and second rotating surfaces in spaced relationship to said first and second outer surfaces, respectively, for

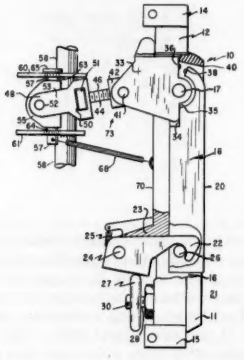
confining said first and second ski equipment members within said first and second openings, respectively.

3,874,203

LEVER-TYPE DOOR LOCK

Floyd V. Bookout, Long Grove, Ill., assignor to Rock-Ola Manufacturing Corporation, Chicago, Ill.

Filed Nov. 12, 1973, Ser. No. 414,754
Int. Cl. E05b *7/00;* **E05c** *3/08*
U.S. Cl. 70—137 **4 Claims**



1. A lever type locking apparatus mountable on a door for securing the same to a stationary jamb, comprising: a lever handle pivotally supported on the door for limited movement about a fixed pivot axis and operable to apply locking force, toggle means pivotally supported at one end adjacent said handle and including means for adjustably altering the length thereof; said toggle means having portions selectively engageable with spaced portions on said handle whereby to lockingly and unlockingly actuate said toggle means in response to predetermined pivotal movements of said handle, rod means mounted on the door remotely of said handle for rotation on an axis paralleling the door jamb, grip plate means connected to said rod means for rotational movement therewith and operable to move past and underengage the door jamb for transmitting locking force thereto; and eccentric connection means between said toggle means and grip plate means for rotatably operating the latter and said rod means in response to actuation of said toggle means, the selected length of said toggle means serving to selectively alter the rotational movement of said grip plate means and the latter's force of locking engagement with said door jamb.

3,874,204

KEYHOLE STUFFER

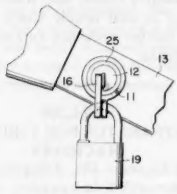
Frank Capri, Woodside, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Jan. 21, 1974, Ser. No. 434,845
Int. Cl. E05b *17/14*
U.S. Cl. 70—427 **2 Claims**

1. A key-operated cylindrical lock shaped for installation in a fixed location with the rim of the lock projecting beyond the surface of the member in which the lock is mounted, said lock incorporating means to fasten a dummy key in place with a padlock so as to prevent tampering with the lock in the locked position, comprising,

a key-operated cylindrical lock, the external rim of which is fitted with an external tab that projects radially beyond the periphery of the rotatable portion of the lock,

a dummy key shaped to fit into the keyslot of said lock but shaped to retain the lock mechanism in the locked position, when so inserted, said dummy key formed with a head that extends radially beyond the periphery of the rotatable portion of the lock, said key head oriented so as to lie adjacent to the external tab of the lock rim when the dummy key is inserted in the keyslot of the lock,



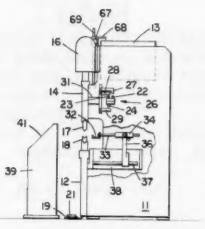
said external tab and said key head each formed with a hole of a size to permit the passage of a hasp of a padlock into both holes when the key is inserted into the keyslot of the lock.

3,874,205

DIGITALLY CONTROLLED MULTIPLE DEPTH STOP AND RETURN STROKE LIMIT CONTROL FOR PRESS BRAKES

Gerald V. Roch, Indianapolis, Ind., and Edward H. Sonn, Westwood, Mass., assignors to Hurco Manufacturing Company, Inc., Indianapolis, Ind.

Filed Feb. 19, 1974, Ser. No. 443,773
Int. Cl. B21d *5/02*
U.S. Cl. 72—8 **26 Claims**



1. Apparatus for controlling the ram of a hydraulic press brake during the procedure of making a series of bends in a workpiece; said apparatus comprising:

manually operable establishing means for establishing a program for variably limiting the travel of a ram of a press brake, said establishing means being arranged in a plurality of stations separately assignable to workpiece bends having different parameters, said establishing means including a first set of manually operated switches for ram closing control and a second set of manually operated switches for ram opening control;

first and second signal outputs, said first output being for a ram closing limit signal and the second output being for a ram opening limit signal;

ram position indicating signal generating means having an output;

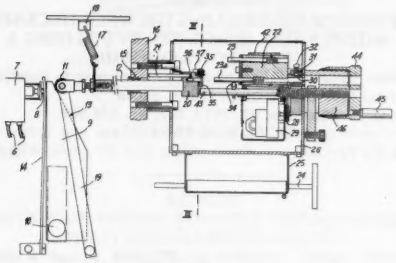
and signal comparing means having inputs coupled to said gnerating means and to said switches for detecting a match between signals from said generating means and signals from said switches during opening and closing movement indicating signals from said signal generating means, to generate a ram stop signal at said first output when a match is made during indication of ram closing movement, and to generate a ram stop signal at said second output when a match is made during indication of ram opening movement.

3,874,206

STROKE-END PROGRAMMER FOR MACHINE TOOL

Paul Cailloux, La Varenne Saint-Hilaire, France, assignor to Promecam Sisson-Lehmann, Saint-Denis, France

Filed June 5, 1974, Ser. No. 476,707
Int. Cl. B21j 9/20
U.S. Cl. 72—22 **7 Claims**



1. Device for programming the terminal portion of the stroke of the tool of a machine tool equipped with a hydraulic control system incorporating a stop-motion consisting essentially of a discharge valve, said device comprising:

a movable stop member comprising a first end disposed in front of said discharge valve and a second end on opposite side,

control wedge rigid with said tool and movable between said first end of said stop member and said discharge valve and adapted to actuate said valve by reacting against said first end of said stop member,

a rotary barrel disposed in front of said second end of said stop member,

a plurality of parallel adjustable studs carried by said rotary barrel,

a pair of parallel rollers constituting a cradle for supporting said barrel laid detachably upon said rollers,

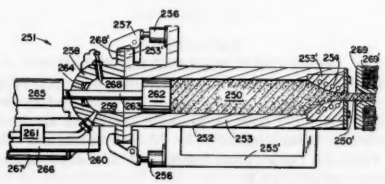
driving means adapted to drive at least one of said rollers, whereby said adjustable studs are brought successively in operative position in front of said stop member.

3,874,207

EXTRUSION APPARATUS

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Continuation of Ser. Nos. 691,622, Oct. 22, 1957, Pat. No. 3,002,615, and Ser. No. 142,405, Oct. 2, 1961, Pat. No. 3,422,648, and Ser. No. 516,280, Dec. 27, 1965, abandoned. This application Feb. 1, 1967, Ser. No. 623,167
Int. Cl. B30b 11/22
U.S. Cl. 72—56 **10 Claims**



1. An extrusion apparatus comprising in combination:

an extrusion die,

an extrusion chamber connected to said extrusion die,

piston means for feeding an extrusion material to be shaped in said die from said chamber to said die,

said die defined by a passageway and an opening from which the extrusion shaped in said die may pass from said die,

means for closing said die opening to prevent the flow of extrusion material from said die,

means for imparting oscillatory movement to said piston means while retaining a predetermined quantity of extrusion material disposed between said piston means and said die to cause said piston means to apply a series of impact forces to said predetermined quantity of extrusion material and while said means for closing said die opening is operatively closing said die opening so as to intermittently work said predetermined quantity of extrusion material while it is held within said chamber and said die, and

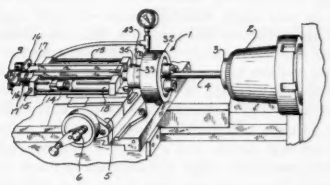
means for operating said die closing means to an open condition so as to permit movement of said predetermined quantity of extrusion material from said die after said intermittently applied forces have predeterminately worked said extrusion material within said extrusion chamber and said die.

3,874,208

SPINNING ADAPTER

John A. Werner, 11602 Watertown Plank Rd., Wauwatosa, Wis. 53226

Filed Sept. 7, 1973, Ser. No. 395,070
Int. Cl. B21d 22/16
U.S. Cl. 72—84 **8 Claims**



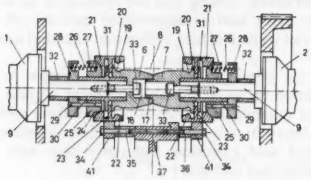
1. A spinning adapter for assembly on the bed of a machine tool having rotatable means for holding a tubular workpiece to be spun to a predetermined internal and external diameter, a support block on the adapter, means to connect the support block to the bed of the machine tool in a predetermined position said adapter having a frame received within said block and adapted for longitudinal movement therein, a mandrel having substantially the internal diameter of said workpiece secured within the frame and adapted to be inserted within said workpiece, a plurality of reducing rollers journaled on said frame at fixed pivot points circumferentially around said mandrel at the end of the frame adjacent the machine tool and disposed to rotate about said pivot points freely of the frame and fixed in engagement with the workpiece assembled on said mandrel, means providing relative rotation of the workpiece and rollers, and means on the adapter effecting relative axial movement between the support block and frame to spin the I.D. of the workpiece on the mandrel by said rollers to the O.D. of the mandrel as the mandrel and the rollers are simultaneously moved longitudinally of the workpiece away from the rotatable means of the machine tool.

3,874,209

APPARATUS FOR SIMULTANEOUSLY TAPERING AND FLANGING THE BODIES OF CYLINDRICAL METAL CANS

Giuseppe Maiorino, Napoli, Italy, assignor to FMI-Mecfond-Aziende Mecchaniche Riunite S.p.A., Napoli, Italy

Filed Aug. 17, 1973, Ser. No. 389,426
Claims priority, application Italy, May 4, 1973, 49793/73
Int. Cl. B21d *19/06, 41/00*
U.S. Cl. 72—91 **2 Claims**



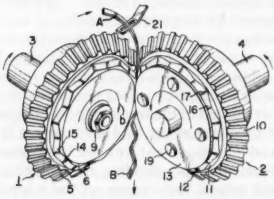
1. Apparatus for simultaneously tapering and flanging the bodies of cylindrical metal cans, comprising a pair of spindles, shafts mounting said spindles for rotation about and sliding movement along a common axis toward and away from each other so as jointly to support a said can when said spindles are together, each spindle having a negative surface on its inner end for shaping one end of a said can, a pair of shaping collars idly mounted on said spindles and having an inner surface having a positive shape corresponding to said negative shape but of a larger diameter than the diameter of said negative shape, each said spindle having a centering end flange for a said can, means for yieldably centering said collars and for permitting said centering means comprising conical rings idly mounted on said shafts, resilient means yieldably urging said conical rings to their center positions, discs idly mounted on said shafts but fixed against axial sliding movement on said shafts, said resilient means acting between said discs and said rings, guide pins disposed in bores in said discs and rings for permitting said rings to slide on said pins axially, a sleeve idly mounted on each said shaft, a flange extending radially outwardly from said sleeve, and a flange extending radially inwardly from each said collar and disposed between said radially outward flange and said end flange of a said spindle to guide the radial displacement of said collar.

3,874,210

APPARATUS FOR PRODUCING A CORRUGATED LEAF SPRING

Junichi Hayashi, Aki, and Tadaki Kobayashi, Hiroshima, both of Japan, assignors to Toyo Kogyo Co., Ltd., Hiroshima, Japan

Filed Dec. 5, 1973, Ser. No. 421,763
Claims priority, application Japan, Dec. 8, 1972, 47-123799
Int. Cl. B21d *13/04*
U.S. Cl. 72—168 **4 Claims**



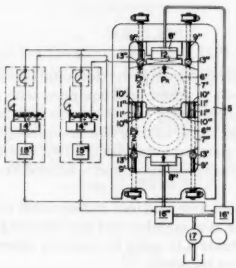
1. An apparatus for producing a corrugated leaf spring having a widthwise curvature, said apparatus comprising: first and second cooperating bevel gears; first and second beveled forming rollers mounted on the respective first and second bevel gears, said first and second forming rollers serving to shape said corrugated leaf spring, having waved contours, and cooperating with each other to form a nip therebetween; means for securely mounting said first forming roller on said first bevel gear; and yieldable means for mounting said second forming roller on said second bevel gear.

3,874,211

METHOD OF CONTROLLING THE WALL THICKNESS WITHIN A TUBE ELONGATER BY UTILIZING A SCREW-DOWN CONTROL

Chihiro Hayashi, Takarazuka, Japan, assignor to Sumitomo Metal Industries Limited, Osaka, Japan

Filed Jan. 22, 1974, Ser. No. 435,509
Int. Cl. B21b *17/04, 37/14*
U.S. Cl. 72—208 **4 Claims**



1. A method for controlling the wall thickness of a tube in a tube elongater with the utilization of a hydraulilc screw down control mechanism, the method comprising the steps of: passing the tube through a tube elongator after the tube has passed through a piercing mill and prior to the tube passing through a reducing mill; passing the tube through the hydraulic screw down control mechanism arranged within the elongator, such mechanism including upper and lower caliber rolls which may be screwed down and opened symmetrically about a pass line as the tube enters and leaves the elongater; controlling the movement of the upper and lower caliber rolls as the tube passes through the mechanism such that the caliber rolls are temporarily screwed down as the ends of the tube pass through the mechanism and are open when the middle of the tube passes through the mechanism, whereby the ends of the tubes are made thinner within the elongater prior to the tube entering the reducing mill.

3,874,212

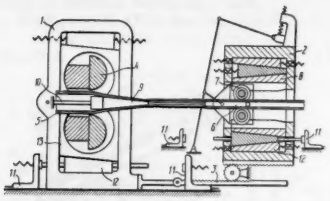
TUBE COLD ROLLING METHOD

Vsevolod Vladimirovich Nosal, Leningradsky prospekt, 72, kv. 205; Vadim Anatolievich Verderevsky, Volgogradsky prospekt, 88, kv. 25, both of Moscow; Veniamin Izrailevich Sokolovsky, ulitsa Mira, 36/7, kv. 73, Sverdlovsk, and Vladimir Pavlovich Platov, ulitsa Mikhailova, 22, korpus 2, kv. 9, Moscow, all of U.S.S.R.

Filed Oct. 4, 1973, Ser. No. 403,622
Int. Cl. B21b *21/00*
U.S. Cl. 72—214 **1 Claim**

1. A method of cold rolling tubes by reducing and sizing them comprising the steps of: placing roll and roller stands coaxially; introducing a tube to be treated into said stands and placing said tube coaxially with the stands; reciprocating said

stands in opposite directions; reducing the tube when moving said stands towards each other; sizing said tube when moving



the stands into opposite directions; and feeding periodically said tube along the axes of the stands.

3,874,213

EXTRUSION METHOD FOR HIGH STRENGTH HEAT TREATABLE ALUMINUM ALLOYS

Philip R. Sperry, North Haven; William C. Setzer, Hamden; Joseph Winter, New Haven, and Michael J. Pryor, Woodbridge, all of Conn., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed May 23, 1974, Ser. No. 472,656
Int. Cl. B21c *29/00*
U.S. Cl. 72—364 **9 Claims**

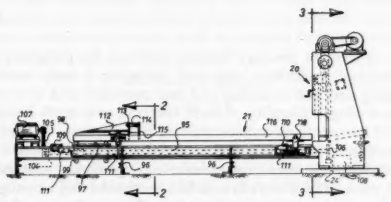
1. A method for extruding high strength, heat treatable aluminum alloys which comprises providing a homogenized cast alloy billet, conducting a first hot extrusion of said billet to a reduction in area of from 20–75%, conducting a second hot extrusion at the solutionizing temperature of the alloy, and quenching the resultant extruded shape after said second extrusion.

3,874,214

MACHINE FOR CORRUGATING A TROUGH-SHAPED METAL STRIP

Andre Racicot, 8495 Gouin Blvd., E., Riviere des Prairies, Quebec, Canada

Filed Apr. 16, 1973, Ser. No. 351,534
Int. Cl. B21d *13/02*
U.S. Cl. 72—307 **6 Claims**



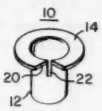
1. Machine for corrugating a trough-shaped metal strip comprising an intermittently operable corrugating press, a carriage, a feeder mechanism for continuously moving said carriage towards said press, a feeder foot engageable with the strip, and resilient means connecting said feeder foot to said carriage and yieldable in the direction opposite to the direction of movement of said carriage, whereby said resilient means yield to allow continuing movement of said carriage when said feeder foot and strip are arrested during the corrugating stroke of the press, said feeder mechanism comprising a stationarymotor-driven screw, and a nut secured to said carriage and engaged with said screw, said resilient means comprising compression springs interposed between said feeder foot and said carriage, said feeder foot being pivotally mounted on said carriage and a stop is provided defining the forward position of said feeder foot.

3,874,215

METHOD OF MAKING MINIATURE LAMP BASE SHELLS

Rudolf A. Gruenberg, Lakewood, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 14, 1973, Ser. No. 415,604
Int. Cl. B21d *28/00*
U.S. Cl. 72—337 **3 Claims**



1. The method of forming a cup-shaped, flanged, metal shell base for a miniature incandescent lamp having a V-shaped cut out in the flange communicating with a vertical slot in the upper portion of base side wall comprising the steps of:

stamping from an elongated metal strip; a truncated generally circular disc, said disc being truncated substantially along a chord perpendicular to a radius of said circular disc; and

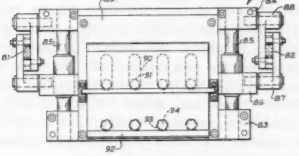
progressively die forming said truncated circular disc into a cup-shaped metal shell base with one-half of the edge of said disc defined by said chord closing toward the other half of the edge of said disc defined by said chord to form said V-shaped cut out in said flange and the vertical slot in the upper portion of said side wall.

3,874,216

FEED DEVICE FOR FORMING APPARATUS

Ward A. Ames, Danville, Ill., assignor to Tridan Tool & Machine, Inc., Danville, Ill.

Division of Ser. No. 211,551, Dec. 23, 1971, Pat. No. 3,780,561. This application Aug. 10, 1973, Ser. No. 387,345
Int. Cl. B21d *43/02*
U.S. Cl. 72—417 **1 Claim**



1. In combination with a progressive die press system for forming holes in a sheet of material, a feeding device for moving the sheet through the system comprising:

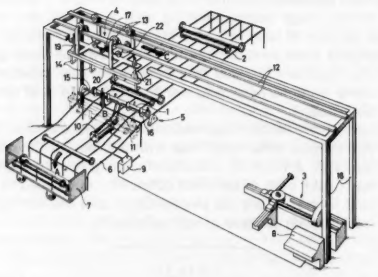
a member connected to the press of the system and extending downwardly therefrom, a first link pivotally connected directly to said member, a frame, a second link pivotally connected to said frame and pivotally connected to said member, a pair of spaced apart and parallel guide tracks fixedly mounted to said frame, a bar slidably mounted to said guide tracks in the direction of feed and pivotally connected directly to said first link, a plurality of spring biased upwardly projecting feed fingers mounted to said bar and engaged with said sheet as said press moves vertically in a given direction and said bar moves in the direction of feed, a second bar fixedly mounted to said guide tracks, and a plurality of spring

biased upwardly projecting retaining fingers mounted to said second bar and engaged with said sheet preventing movement of said sheet as said press moves vertically in a direction opposite of said given direction.

3,874,217
AUTOMATIC SORTING APPARATUS IN PIPE WORKING SYSTEM

Kaoru Shiozawa, Chiba, Japan, assignor to Mitsui Shipbuilding and Engineering Co. Ltd., Tokyo, Japan

Filed July 25, 1973, Ser. No. 382,527
Claims priority, application Japan, Aug. 9, 1972, 47-80264
Int. Cl. B21b *43/00*
U.S. Cl. 72—419 **2 Claims**



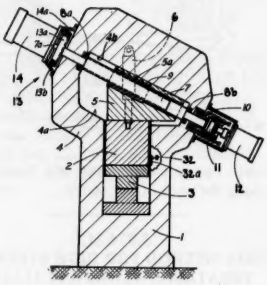
1. A pipe working system comprising pipe conveyor means for supplying a series of pipes some of which are to be bent and some of which are not, carrier means at the output end of said conveyor means for receiving said pipes which are not to be bent, pipe feeding means adjacent said conveyor means for receiving said pipes from the input end of said conveyor means and for controlledly releasing them one at a time toward said output end of said conveyor means, pipe bender means, overhead beam means extending from above said conveyor means to above said bender means, pipe loader means suspended from and controlledly movable along said beam means, said pipe loader means comprising downwardly extending hook means and means for controlledly lowering and raising said hook means to intercept, raise, and deliver to said bender means only those of said pipes released by said pipe feeding means which are to be bent.

3,874,218
POWER PRESS WITH A FLYWHEEL AND SPINDLE DRIVE

Horst Bachmann, Einberg, Germany, assignor to Langenstein & Schemann Aktiengesellschaft, Coburg, Germany

Continuation of Ser. No. 116,507, Feb. 18, 1971, abandoned. This application Aug. 29, 1973, Ser. No. 392,487
Claims priority, application Germany, Feb. 19, 1970, 2007505
Int. Cl. B21J *9/18*
U.S. Cl. 72—452 **10 Claims**

1. A power forging press including a press stand provided with a drive having a flywheel, a threaded spindle and a drive device, a workpiece support, a ram mounted for relative movement with respect to said workpiece support, and a wedge housed in the press stand and acting on the ram, said flywheel-spindle drive being arranged with the axis of the flywheel and its spindle extending transversely to the direction

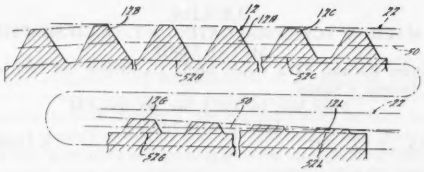


of movement of the ram, and means operably connecting the spindle and wedge.

3,874,219
TOOTH FORMING TOOL

Robert L. Miller, Warren, and Louis M. Fisset, Roseville, both of Mich., assignors to Ex-Cell-O Corporation, Highland Park, Mich.

Filed June 22, 1973, Ser. No. 372,475
Int. Cl. B21h *5/02*
U.S. Cl. 72—469 **2 Claims**

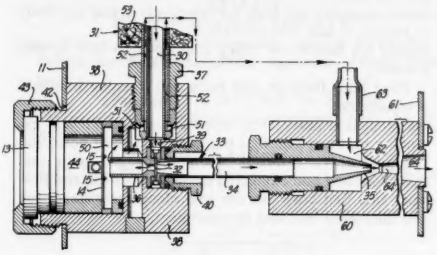


1. A tool for pressure forming teeth on the periphery of a cylindrical workpiece, said tool including a body having a leading end and a trailing end and provided with a working face having a plurality of teeth thereon, said teeth being divided into sections each containing a multiplicity of teeth, all of said teeth having a common pitch line, a first section of said teeth being disposed between said leading end and said trailing end, each of said teeth in said first section having a configuration conjugate to the configuration of the teeth to be formed on the workpiece, a plurality of additional sections of teeth disposed between said leading end and said first section of teeth, each of said teeth in each of said sections including planar leading and trailing flank surface portions, each of said teeth in said additional sections including a planar top land the top lands of the teeth in said additional sections being disposed intermediate the top lands of the teeth in said first section and said pitch line, the root lines of the teeth in said additional sections being stepped and disposed intermediate the root line of the teeth in said first section and said pitch line, the tooth thickness of all of said teeth in all of said sections as measured in the pitch line thereof being constant from section to section from the teeth in said first section to said leading end, the distance between the teeth in successive sections as measured on the pitch line thereof being constant progressing from said leading end to said first section of teeth.

3,874,220
LOW PRESSURE DEW AND FROST POINT INDICATOR

Robert S. Sheldon, Northridge, Calif., assignor to Air-Dry Corporation of America, Northridge, Calif.

Filed Jan. 26, 1973, Ser. No. 326,979
Int. Cl. G01n 25/02, 25/66
U.S. Cl. 73—17 A 2 Claims



1. In a dew and frost point indicator for measuring the amount of water vapor in a gas stream of the type in which a sample of said gas stream flows past the face of a mirror and which includes means for cooling the back of the mirror, means for observing the moment when precipitation first occurs on the face of the mirror and means for determining the temperature of the mirror when precipitation first forms, said indicator including a vortex tube to cool the back of said mirror, said vortex tube having a generator chamber, a cold air outlet and a hot air outlet, means connecting a stream under pressure to said generator chamber for operation of said vortex tube toward the back of said mirror to cool said mirror and operate said indicator, said gas stream being tested flowing past the face of said mirror without reduction of its input pressure so that said indicator provides a direct reading of moisture content without requiring mathematical conversion for pressure reduction, the improvement comprising regenerative means for continuously using the cold air output from said vortex tube to pre-cool the vortex tube operating stream before it enters said generator chamber to provide lower temperature cold air output from said vortex tube, and means continuously connecting said cold air output from said regenerative means to a venturi tube together with the hot air output of said vortex tube, to reduce the pressure ratio between the hot air and cold air outputs of said vortex tube and thereby provide lower temperature cold air output from said vortex tube.

3,874,221
TRANSDUCERS

David John Deverill Lockie, Heath End, England, assignor to The Salartron Electric Group Limited, Hampshire, England

Filed May 3, 1972, Ser. No. 249,839
Claims priority, application United Kingdom, May 5, 1971, 13320/71; May 5, 1971, 13321/71
Int. Cl. G01n 9/00
U.S. Cl. 73—30 7 Claims

1. A transducer for use in measuring a physical property of a fluid, the transducer comprising:

a substantially rigid casing;

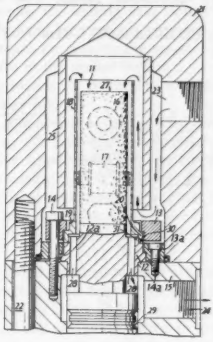
a tubular hollow body disposed within said casing, said body being open at one end and having a tubular resilient wall of uniform thickness spaced from the casing to permit vibration of said wall;

means for defining an inlet in said casing for permitting entry of fluid into said casing;

means for elastically deforming said wall to excite bell-like vibration thereof;

means for providing a signal representative of a frequency of the said vibration; and

circumferential node-forming means at the other end of said body,

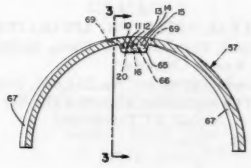


said tubular wall of uniform thickness extending from said open end to said node-forming means.

3,874,222
PIPELINE LEAK DETECTOR

Harry A. Ladd, P.O. Box 144, Indianola, Wash. 98342, and Frederick L. Schenck, 302 W. Benjamin Holt Dr., Stockton, Calif. 95207

Filed July 23, 1973, Ser. No. 381,731
Int. Cl. G01m 3/00
U.S. Cl. 73—40.5 R 11 Claims



1. A device for detecting and locating leaks in an elongated conduit carrying a thermally unstable fluid comprising:

A. a plurality of detecting circuits each comprising at least two detecting wires having spaced temperature sensing means in parallel between said wires which actuate means to close a circuit when a temperature influenced by escaping fluid is sensed,

B. means associated with each temperature sensing means for producing a signal in said detecting wires unique to that temperature sensing means,

C. a signal carrying circuit connectible to all detecting circuits along said conduit and terminating in a monitoring station,

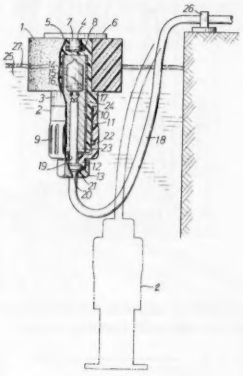
D. means for transferring a signal indicating a leak from each detecting circuit into said signal carrying circuit, and

E. means in said monitoring station to identify said unique signal.

3,874,223
LIQUID DETECTOR

Ken Miyazaki; Toshitaka Terai; Kazutoshi Takahashi, all of Yokohama, and Hiroshi Sato, Kawasaki, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaishia, Osaka, Japan

Filed Mar. 30, 1973, Ser. No. 346,426
Claims priority, application Japan, Oct. 14, 1972, 47-103410
Int. Cl. G01n 9/00; G01m 3/08
U.S. Cl. 73—32 R 30 Claims

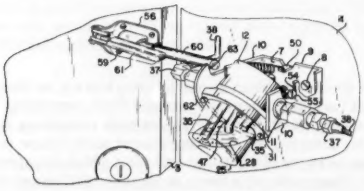


1. A liquid detector comprising:
a. a detector element comprising a material which dissolves upon contact with a liquid to be detected;
b. means for generating a signal upon the breaking of the detector element due to the dissolution thereof;
c. means for holding the detector element at an end; and
d. bias means for applying a biasing force to another end of the detector element to hasten the breaking thereof upon dissolution and accelerate the operation of said signal generating means.

3,874,224
LEAK DETECTING APPARATUS

Richard S. Smith, Overland Park, Kans., assignor to Seek-A-Leak, Inc., Kansas City, Mo.

Continuation-in-part of Ser. No. 264,041, June 19, 1972, abandoned. This application Aug. 29, 1973, Ser. No. 392,762
Int. Cl. G01m 3/06
U.S. Cl. 73—40 15 Claims

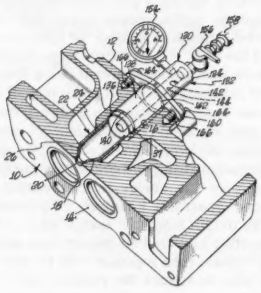


1. Apparatus for detecting leaks into a mobile shelter and the like from a bottled gas pipe system associated therewith comprising:
a. a body having first and second bores extending inwardly from the exterior thereof, a transparent bowl mounted on said body and forming a closed compartment therewith, said first and second bores opening into said compartment;
b. a first tubular member engaged in said first bore and having one end projecting into said compartment, liquid partially filling said compartment to the extent that said one end is selectively free of and submerged in said liquid upon tilting said body from a first position to a second position on an axis transverse to said tubular member;
c. means for mounting said body on said mobile shelter for tilting between said first and second positions;
d. means connecting said pipe system to said bores for flow through said bores and out said one end;
e. means engaging said body for selectively urging said body to remain in said first position;
f. means for selectively tilting said body to said second position;
g. a third bore through said body and opening into said compartment;
h. an elongated passageway communicating with and extending between said first bore and said third bore; and
i. adjustable valve means operably engaged along said third bore and said elongated passageway to control flow from said first bore through said elongated passageway and third bore into said compartment.

3,874,225
PRESSURE TESTER FOR INJECTOR SLEEVE OF DIESEL ENGINE HEAD

Albert Fegel, Whittier, Calif., assignor to Irontite Products Co., Inc., El Monte, Calif.

Filed Oct. 1, 1973, Ser. No. 402,463
Int. Cl. G01M 3/26
U.S. Cl. 73—40 13 Claims



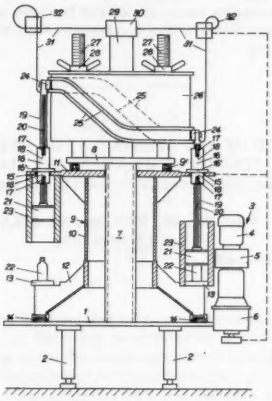
7. A pressure tester for a fuel injector sleeve installed in a diesel engine cylinder head, the cylinder head having a generally cylindrical cavity extending from the top side of the cylinder head toward the bottom side thereof, the cylindrical cavity terminating adjacent the bottom side of the cylinder head in a convergent, frusto-conical cavity which, in turn, terminates in a cylindrical opening extending through the bottom side of the cylinder head, the injector sleeve having cylindrical and convergent frusto-conical portions respectively disposed in the cylindrical and frusto-conical cavities in the cylinder head, the cylindrical cavity having an upwardly facing, internal annular shoulder therein above the injector sleeve, the pressure tester including:
a. a tester body having an inner portion insertable into the cylindrical cavity in the cylinder head and having an external annular shoulder seatable on said internal annular shoulder to limit insertion of said tester body;
b. means for securing said tester body to the cylinder head;
c. a top seal carried by said inner portion of said tester body and engageable with the peripheral wall of the cylindrical cavity in the cylinder head above said internal annular shoulder;
d. an air passage including a first portion through said tester body and having its inner end in communication with the interior of the sleeve;

e. means for connecting the outer end of said air passage to a source of compressed air;
f. a pressure gauge communicating with said air passage; and
g. a valve outwardly of said pressure gauge and controlling air flow through said air passage.

3,874,226
BOTTLE SORTING APPARATUS

Max Weber, Kolliken, Switzerland, assignor to Elcalor AG, Fabrik fur Elektrothermische Apparate, Aarau, Switzerland

Filed Sept. 17, 1973, Ser. No. 397,988
Claims priority, application Switzerland, Sept. 18, 1972, 13633/72
Int. Cl. G01m *3/32*
U.S. Cl. 73—45.2 **8 Claims**

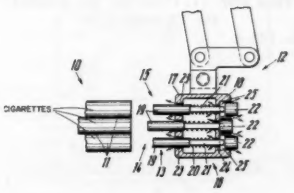


1. Apparatus for sorting bottles having each an axis, a bottom at one axial end, and a neck at the other axial end according to their compressive strength, resistance to internal gas pressure, and leak proofness comprising, in combination:
a. bottle carrier means movable for carrying a plurality of bottles sequentially through a plurality of stations, said bottle carrier means including
1. a plurality of platforms,
2. a sealing head associated with each platform and including
i. a casing bounding a chamber therein,
ii. a piston slidable in said casing inward and outward of said chamber and having a bottle neck engaging portion formed with a bore, and
iii. shut-off valve means communicating with said bore;
b. feeding means for feeding respective bottles to said platforms at a feeding station and for placing each bottle on the associated platform in a position in which the axis of said bottle extends away from said platform toward the associated sealing head;
c. cam means for causing relative movement of said platform and of said sealing head in the direction of said axis toward and away from a relative position in which said portion engages the neck of a bottle placed on the associated platform;
d. at least one source of gas under pressure;
e. conduit means connecting said at least one source to said chamber for biasing said piston outward of said chamber under the pressure of said gas and for thereby exerting compressive stress on a bottle engaged by said portion,
1. said cam means including means for causing said relative movement of said platform and said sealing head until a bottle having adequate resistance to said compressive stress moves said piston inward of said chamber,
2. said valve means responding to said inward movement of said piston by connecting said bore to said chamber and thereby admitting gas under pressure to said bottle through the engaged neck, whereby internal gas pressure is exerted on said bottle;
f. sealing means for sealing said bottle from said source while under said internal gas pressure;
g. sensing means for sensing the maintenance of said internal pressure in the sealed bottle;
h. deflecting means for deflecting a tested bottle from said bottle carrier means;
i. actuating means for actuating said deflecting means in response to the failing of said tested bottle under said compressive stress, failing of the tested bottle under the internal pressure of the admitted gas, or failing of the tested bottle to maintain said internal pressure;
j. discharge means for discharging the bottles not deflected by said deflecting means from said bottle carrier means; and
k. a tubular shield fastened to each of said sealing heads for movement therewith relative to the associated platform for enveloping a bottle placed on said platform when said sealing head and said platform are in said relative position thereof, said cam means including means for keeping said sealing head and said shield remote from said platform while said feeding means feed a bottle to the associated platform and said discharge means discharge a bottle from said platform.

3,874,227
TESTING DEVICES FOR CIGARETTE PACKING MACHINES

Heinz Focke, 64 Moorstrasse, 3090 Verden, Germany

Filed June 18, 1973, Ser. No. 371,079
Claims priority, application Germany, June 16, 1972, 2229382
Int. Cl. G01n *3/08*
U.S. Cl. 73—94 **5 Claims**

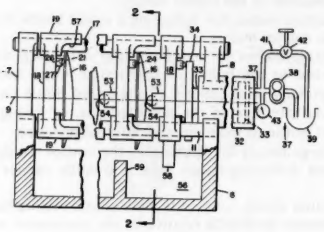


1. A testing device for cigarette packaging machines for simultaneously testing the ends of cigarettes disposed in a group, said device comprising a support housing having a plurality of apertures extending therethrough, tappet means slidably disposed in said apertures, control head means connected to one end of said tappet means, open recess means for receiving said control head means therein, biasing means acting on said tappet means to normally dispose said control head means in said recess means, a plurality of passages, each passage intersecting a plurality of said recess means, light source means and light detector means mounted at opposite ends of each passage for providing and receiving a light beam when all of said control head means are forced out of said recess means upon engagement of said tappet means with a perfect group of cigarettes, one or more of said light beams being interrupted upon engagement of one or more faulty cigarettes by one or more of said tappet means so that said control head means remains in said recess means.

3,874,228
LENS TESTER

Irving Fatt, Berkeley, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Filed Aug. 20, 1973, Ser. No. 390,043
Int. Cl. G01n *3/04*
U.S. Cl. 73—94 15 Claims

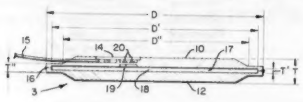


1. A lens tester comprising a frame extending along an axis, means on said frame providing a support having a contact surface located in a plane normal to said axis, a plunger having a contact end, means for mounting said plunger for axial movement on said frame toward and away from said support and with said contact end in a plane normal to said axis, means interconnecting said frame and said plunger for so moving said plunger, and a slider mounted on said frame for sliding movement in the direction of said axis and disposed between said support and said contact end.

3,874,229
PANCAKE LOAD CELL

Alfred Newman Ormond, 11969 E. Rivera Rd., Santa Fe Springs, Calif. 90670

Filed Mar. 11, 1974, Ser. No. 449,901
Int. Cl. G01l *1/22*
U.S. Cl. 73—141 A 4 Claims



1. A load cell comprising:

a. an upper flat circular plate member having an upper shallow circular cavity on its underside;

b. a lower flat circular plate member having a lower shallow circular cavity on its top side opposing said upper shallow circular cavity;

c. means securing said upper plate member on top of said lower plate member such that the shallow cavities define an hermetically sealed circular chamber of inside diameter D′ and inside thickness T′ within said members, the overall configuration resulting in a general pancake shaped load cell of outside diameter D and outside central area of thickness T, the peripheral portion of the members radially beyond the central area of thickness T having a reduced outside thickness of T″, the diameter of the end of the reduced outside thickness being D″; wherein:

$10<D/T<20$	$8<D'/T'<18$,
$1.001<D/D'<1.050$	$5<T/T'<11$,
$1.10<D/D''<1.20$ and	$3<T/T''<6$;

d. a substantially incompressible fluid filling said chamber, said upper plate member including a thinned wall area in the ceiling of its shallow cavity substantially less than the total area of the cavity defining a diaphragm of diameter *d* and thickness *t* responsive to the pressure of the fluid in said chamber, wherein:

$10<D/d<16$ and $20<d/t<30$;

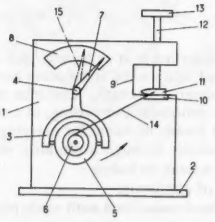
and

e. strain gauge means secured tc said diaphragm for providing a signal constituting a function of the pressure of said fluid whereby said load cell can be easily accommodated in areas of low vertical clearance to support objects to be weighed.

3,874,230
METHOD OF AND APPARATUS FOR DETERMINING THE TENSION OF FILAMENTARY MATERIAL

Albin Keller, Blumenweg 2879, Gahwil, (St. Gallen), Switzerland

Filed Dec. 26, 1973, Ser. No. 428,611
Int. Cl. G01l *5/04*
U.S. Cl. 73—143 16 Claims

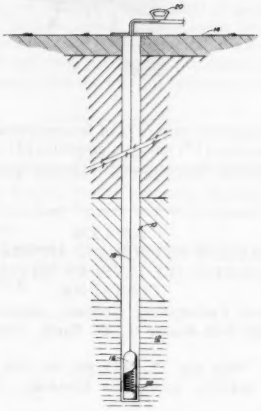


1. A method of determining the tension of filamentary material which is to be withdrawn under adjustable tension from a package, particularly from a bobbin of an embroidery shuttle, comprising the steps of rotatably mounting the package at a first location and engaging a free end portion of the filamentary material under an adjustable tension; connecting a free end of said end portion to a turnable element which is mounted at a spaced second location for turning movement about a first axis and for angular displacement with said first axis from a rest position about a second pivot axis; turning said element about said first axis to take up the filamentary material against the force of the tension acting thereon, with resultant angular displacement of said element and first axis from said rest position about said second pivot axis; and continuously measuring the extent of such angular displacement from said rest position as an indication of the magnitude of said tension.

3,874,231
DIFFUSION BARRIER CHAMBER FOR SPERRY SUN PERMAGAGE TYPE PRESSURE GAGE

Herbert C. Walther, Jr., Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Dec. 19, 1973, Ser. No. 426,167
Int. Cl. E21b 47/06
U.S. Cl. 73—151 8 Claims



1. In a device for detecting pressure and pressure changes in a subterranean formation penetrated by a wellbore, said device including a chamber means positioned in said wellbore and in fluid communication with said formation, and a tubular means in fluid communication with said chamber means and in fluid communication with a means for detecting pressure and pressure changes in said wellbore, the improvement comprising; providing means in fluid communication with said tubular means and said formation for preventing the mixture of formation fluids with fluids contained in said tubular means, said means comprising an extended flow path in fluid communication with the lower end of said tubular means and said formation, said extended flow path being positioned to fluidly transmit pressure changes to said tubular means and prevent the entry of formation fluids into said tubular means upon changes in the formation pressure.

3,874,232
GEOTHERMAL EXPLORATION

Jack E. Hardison, Garland, Tex., assignor to Atlantic Richfield Company, New York, N.Y.

Division of Ser. No. 66,285, Aug. 24, 1970, Pat. No. 3,714,832. This application June 15, 1972, Ser. No. 263,175
Int. Cl. E21b 47/06
U.S. Cl. 73—154 4 Claims

1. Temperature measuring apparatus for insertion into a borehole comprising:

a. a tubular probe;

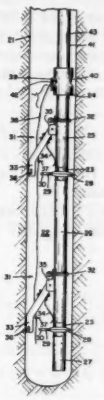
b. a plurality of temperature sensors mounted in spaced relation along said probe;

c. a plurality of arms pivotally attached along one side of said probe for movement in a vertical plane;

d. means for holding said arms against said probe during insertion thereof into the borehole;

e. means actuable from the surface for simultaneously releasing said arms after said probe is inserted; and

f. spring means for urging said arms outward from said probe into contact with the wall of said borehole adjacent said one side of said probe, thereby decentralizing said probe and forcing said sensors laterally into contact with

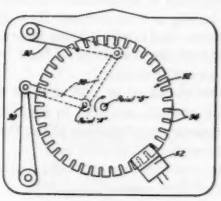


the wall of the borehole adjacent the opposite side of the probe.

3,874,233
GAS VOLUME METER

Clifford Sanctuary, Palos Verdes Estates; Donald C. Woods, Big Bear City, and John A. Bachman, Woodland Hills, all of Calif., assignors to Del Mar Engineering Laboratories, Los Angeles, Calif.

Division of Ser. No. 243,369, April 12, 1972,. This application July 20, 1973, Ser. No. 380,976
Int. Cl. G01f 11/08
U.S. Cl. 73—194 E 3 Claims



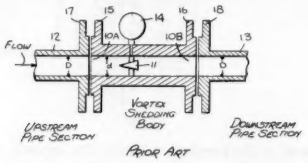
1. A gas volume meter for generating an electric pulse each time a predetermined volume of gas passes therethrough, said gas volume meter comprising: a housing; means for raising the internal temperature of the housing to a particular temperature; a first tubular member extending into the housing for introducing a gas into the interior of the housing; a second tubular member extending from the housing for exhausting the gas from the interior of the housing; a rotatable member mounted in said housing and having a plurality of sensor elements thereon at predetermined angular positions and having predetermined angular spacings between successive ones of said elements; a drive means mounted in said housing and mechanically coupled to the rotatable member for rotatably driving the rotatable member in response to the gas passed through the housing, said drive means imparting a non-uniform rotation to the rotatable member in the presence of a uniform flow of gas through the housing, and the individual angular spacings between said sensor elements being selected to compensate for such non-uniform rotation; and

electric transducer means in sensing relationship with the sensor elements of said rotatable member for generating an electric pulse each time a predetermined volume of gas passes through the housing, the predetermined angular spacings between successive ones of the sensor elements being selected so that the volume of gas represented by each electric pulse generated by the electric transducer means is measured to a standard temperature different from the internal temperature of the housing by a predetermined amount.

3,874,234
VORTEX SHEDDING FLOWMETER

Thomas H. Burgess, Horsham, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed June 27, 1973, Ser. No. 374,114
Int. Cl. G01f *1/00*
U.S. Cl. 73—194 B **4 Claims**



PRIOR ART

1. A vortex-shedding flowmeter which is installed in a line carrying the fluid to be metered, the line having an upstream pipe section and a downstream pipe section, said upstream pipe section having a predetermined internal diameter and internal area, said flowmeter comprising:

A. a flow conduit having a constricted passage therein whose internal area is smaller than said predetermined pipe section area, said passage having a substantially uniform internal diameter throughout its length, said flow conduit being provided with mounting means to interpose said conduit between said upstream and downstream sections to cause all fluid carried by said upstream section to flow through said passage whereby fluid entering said flow conduit through said upstream section encounters said passage and is conditioned thereby to render entering fluid having a non-uniform flow distribution profile more uniform, said conduit being internally rounded at its inlet to smooth the transition of fluid from said upstream section into said passage;

B. an obstacle mounted in said conduit adjacent said inlet to produce periodic vortices in said constricted passage whose frequency is a function of the flow rate of the fluid passing through the conduit; and

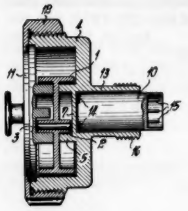
C. means to convert said periodic vortices into a signal indicative of flow rate.

3,874,235
ROTARY PISTON METER FOR MEASURING THE FLOW OF LIQUIDS

Ulrich Christian Sanden, Hildesheim, Germany, assignor to Diessel GmbH & Co., Hildesheim, Germany

Filed Sept. 7, 1973, Ser. No. 395,349
Claims priority, application Germany, Sept. 7, 1972, 2243936
Int. Cl. G01f *3/08*
U.S. Cl. 73—253 **12 Claims**

1. A rotary piston meter for measuring the flow of liquids having a housing with a first cylindrical compartment and a second cylindrical compartment, said compartments separated by a vertical wall, said compartments located coaxial on a horizontal axis perpendicular to said vertical wall, an annular track located in said first compartment perpendicular to said horizontal axis, a rotary piston located in said first compartment having at least one magnet (**3**) parallel to said horizontal axis and adapted to move during its rotation in said annular track, a primary element (**10**) located in said second compartment provided with counterpoles (**14**) opposite said annular track, said counterpoles defined by diagonally opposite free ends (**18**) bent outwardly at right angles of a U-

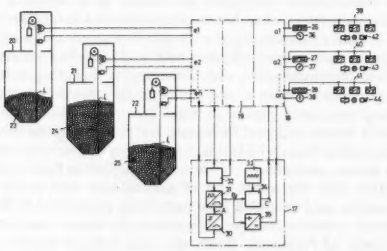


shaped conductive strip (**17**) of ferromagnetic material, said conductive strip (**17**) having a crossbar (**21**) and at least one semi-conductor element located in proximity to said cross-bar (**21**).

3,874,236
VIBRATION METHOD AND APPARATUS FOR MEASURING THE LEVEL OF MATERIAL IN A CONTAINER

Martin Reck, Ludwigsburg, Germany, assignor to Fabrik fur Pat, Sicherheits-Roster G. W. Barth, Ludwigsburg, Germany

Filed Jan. 22, 1973, Ser. No. 325,366
Claims priority, application Germany, Jan. 22, 1972, 2203081
Int. Cl. G01f *23/00, 23/28*
U.S. Cl. 73—290 V **27 Claims**



1. The method of measuring the level of material in a container comprising the steps of locating a single elongated rope under constant tension in said material to extend between an anchor within the container and a fixed point exterior of the maximum level of said material, thereafter filling said container at least partially to provide an extending portion of said rope free of the contents thereof, exciting the free portion of said rope above the level of said material to vibrate transversely to its elongation, sensing the vibration of the free portion of the rope at a point between the fixed point and the level of said material and determining the level of material in said container as a function of the relative variation of this vibration in selected ones of resonance frequency, wave length and amplitude of said vibrations with respect to at least one of the distances between the sensing point and the level of said material, the level of said material and the anchor, and the level of said material and the fixed exterior point.

21. Apparatus for measuring the level of material in a container comprising a single rope, means for anchoring one end of said rope in the bottom wall of said container, and means for fastening the other end of said rope exterior of said container above the top thereof, means for maintaining said rope

under constant tension, said rope passing through the material located in said container, said material surrounding a portion of said rope and leaving a portion thereof between the surface of the material and the exterior fastening means free, means for exciting the free rope portion between the exterior fastening point and the level of said material to vibrate transversely of its length, sensing means positioned adjacent said free rope portion for sensing the vibrations generated by rope in response to said excitement means and means for determining the level of material in said container as a function of the relative variations of this response in selected ones of resonance frequency, wave length and amplitude of said vibrations with respect to at least one of the distances between said sensing means and the level of said material, the level of said material and the anchoring point within said container and the level of said material and the exterior fastening point.

3,874,237

LIQUID LEVEL HEIGHT MEASURING APPARATUS

Cornelis M. G. Zwarts, Pointe Gatineau, Quebec, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Filed Feb. 15, 1973, Ser. No. 332,544
Int. Cl. G01f *23/28*
U.S. Cl. 73—290 R **5 Claims**

1. A liquid level measuring device comprising:

a. an oscillator made up of a transmission line positionable in the liquid so that the liquid surface provides a reflection causing discontinuity in said line and an electrically energized tunnel diode connected to said line and transmitting a wavefront along said line when switched from one state to the other and being switched to a second state by a reflected wavefront obtained from said line, and

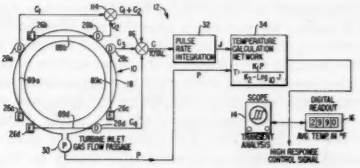
b. means for measuring the period or frequency of oscillation of said oscillator, said period or frequency being related to the distance from the switching device along the transmission line to the liquid surface.

3,874,238

APPARATUS USING RADIOACTIVE PARTICLES FOR MEASURING GAS TEMPERATURES

William A. Compton; Thomas E. Duffy, and Manfred I. Seegall, all of San Diego, Calif., assignors to International Harvester Company, San Diego, Calif.

Continuation-in-part of Ser. No. 293,347, Sept. 29, 1972, abandoned, which is a continuation of Ser. No. 88,670, Nov. 12, 1970, abandoned. This application Feb. 23, 1973, Ser. No. 335,147
Int. Cl. G01k *13/02, 11/28;* **G01n** *9/24*
U.S. Cl. 73—339 R **41 Claims**



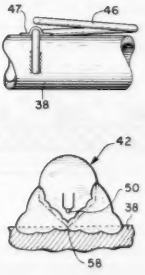
1. Apparatus for producing a signal indicative of the temperature of a heated gas, comprising: a beta particle emitter; means including a beta particle detector for generating a first signal indicative of the attenuation of the beta particles in a body of gas located between said emitter and said detector; pressure transducer means for generating a second signal indicative of the pressure on the body of gas; and means having as inputs said first and second signals for producing a third signal indicative of the average temperature of said gas along a path between said emitter and said detector.

3,874,239

SURFACE THERMOCOUPLE

Philip F. Finney, Villa Park, Ill., assignor to Thermo-Couple Products Company, Inc., Winfield, Ill.

Filed Mar. 4, 1974, Ser. No. 447,961
Int. Cl. G01k *1/16, 1/20, 7/04*
U.S. Cl. 73—349 **17 Claims**



1. A surface thermocouple assembly for monitoring the temperature of a surface to which it is attached wherein one end of the assembly is a cold junction end for connection to a temperature readout instrument and the other end is a hot junction end, said assembly comprising, an elongated tubular metal sheath, a pair of spaced thermocouple conductors within the sheath, electrical insulating material spacing and supporting said conductors within the sheath in insulating

relation from each other and from the sheath, said conductors at the cold junction end adapted to be connected to the readout instrument, said conductors at the hot junction end being bent at substantially right angles to the sheath axis and extending through an opening in the sheath wall, a ceramic insulating plug in the opening receiving and holding said conductors in spaced and insulated relation from each other and from the sheath, a fusion weld at the ends of the conductors outside the plug defining the thermocouple hot junction, and a pad integral with the sheath and the hot junction, said pad having a substantially knife-shaped edge for direct engagement with the surface for w' ich the temperature is to be monitored.

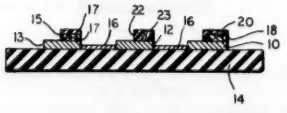
13. In combination with a heat exchanger tube carrying a fluid to be heated and subjected to high temperature gases and flame, a surface thermocouple assembly mounted on the tube for monitoring the temperature thereof, said assembly including a hot junction end secured to the outer surface of the tube and a cold junction end connected to a temperature readout instrument, said assembly comprising, an elongated tubular metal sheath, a pair of spaced thermocouple conductors within the sheath, electrical insulating material spacing and supporting said conductors within the sheath in insulating relation from each other and from the sheath, said conductors extending from the cold junction end for connection to the readout instrument, said conductors at the hot junction end being bent at substantially right angles to the sheath axis and extending through an opening in the sheath wall, a ceramic insulating plug in the opening receiving and holding said conductors in spaced and insulated relation from each other and from the sheath, a fusion weld at the ends of the conductors outside the plug defining the thermocouple hot junction, a pad integral with the sheath and the hot junction, said pad having a substantially knife-shaped edge for direct engagement with the outer surface of the tube, and weld means providing a void-free weld union between the pad and the tube.

3,874,240

HEAT DETECTION AND COMPOSITIONS AND DEVICES THEREFOR

Alan Rembaum, Altadena, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Division of Ser. No. 836,280, June 25, 1969, Pat. No. 3,700,603. This application July 20, 1972, Ser. No. 273,519
Int. Cl. G01k *11/16*
U.S. Cl. 73—356 **4 Claims**



1. A method of detecting temperature change comprising the steps of:

applying to a heat generating element a layer of a thermochromic mixture of an electron donor compound and electron acceptor compound that forms a weakly associated color complex in the liquid state;

sealing said layer to said element by applying to said layer a solution of a transparent plastic in a solvent to encapsulate said layer, said layer being substantially insoluble in said solvent, whereby only said layer is covered while the remainder of said element is exposed; and

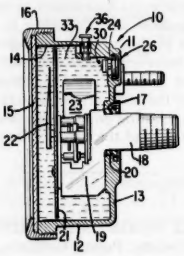
observing the appearance of color change in said layer is an indication of temperature change.

3,874,241

LIQUID-FILLED PRESSURE GAUGE

Philip W. Harland, Perkasie, and Ralph D. Waite, Sellersville, both of Pa., assignors to Ametek, Inc., New York, N.Y.

Filed Mar. 15, 1973, Ser. No. 341,735
Int. Cl. G01l *7/04*
U.S. Cl. 73—416 **9 Claims**



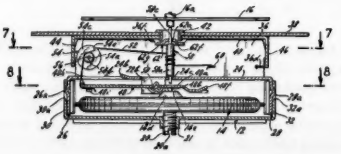
1. In a liquid filled pressure gauge, the combination including a casing having a filling aperture therein, plug means inserted in said aperture to seal the liquid within said casing, and axially spaced locking flanges on said plug means lockingly engageable with said filling aperture for retaining said plug means in completely sealed and closed position after gauge installation, with said plug means and the axially spaced locking flanges thereon being manually moved relative to said aperture to completely open locked position for relief venting, and said plug means being manually moved to return said plug means to closed locked position after venting.

3,874,242

PRESSURE-RESPONSIVE INSTRUMENT

James Csaposs, Maywood; Heinz Eberhard, Kinnelon, and Anton Menzer, Teaneck, all of N.J., assignors to Springfield Instrument Company, Inc., Hackensack, N.J.

Division of Ser. No. 279,980, Aug. 11, 1972. This application June 20, 1973, Ser. No. 371,830
Int. Cl. G01i *7/06*
U.S. Cl. 73—432 A **5 Claims**



1. A motion-amplifying mechanism for a pressure-responsive instrument comprising a supporting frame for said motion-amplifying mechanism having a mounting plate, an actuating lever, means pivotally mounting said actuating lever on said frame at a first pivot extending parallel to the plane of said mounting plate, indicator means including a pointer arbor journaled on said frame perpendicular to the plane of said mounting plate, a differential coupling pulley, means pivotally mounting said coupling pulley on said frame at a second pivot parallel to and spaced from said first pivot, a cord wound around said arbor and operatively connected to said coupling pulley and to said actuating lever and a common instrument and indicator bias spring operatively connected to said cord.

3,874,243

VEHICLE SPEED GOVERNOR

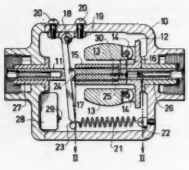
Naoji Sakakibara, Chiryu, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Nov. 9, 1973, Ser. No. 414,429

Claims priority, application Japan, Nov. 16, 1972, 47-132356

Int. Cl. G01p *3/16*; G05d *13/16*

U.S. Cl. 73—526 5 Claims



4. A vehicle speed governor including a housing, a shaft which is revolved by the vehicle engine, a carriage mounted on the shaft to rotate therewith, at least a pair of centrifugal weights pivoted to the carriage to swing, an arm extending from the weights, a plunger axially slidably movable on the axis of rotation of the shaft, drive means normally springbiased toward abutment against one end of the plunger and means for abutting said plunger against the carriage, electric circuit controlling means operatively connected with said drive means for controlling the vehicle travelling speed, and resiliently connecting means to keep the extremity of the arm in resilient contact with the end of said plunger, said resiliently connecting means being a U-shaped member of resilient property, said plunger being provided with a notch, and the arms being provided with a small hole, one end of the member being flexed with its extremity fitting the notch, the other end of the member fitting the small hole.

3,874,244

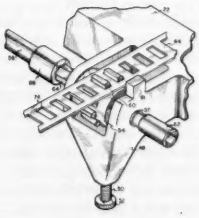
CAMPER LOADING AND SECURING SYSTEM

Reed Rasmussen, 168 W. Gentile, Layton, Utah 84041, and Carl M. Rasmussen, 197 E. 1400 South, Bountiful, Utah 84010

Division of Ser. No. 305,755, Nov. 13, 1972, Pat. No. 3,819,077. This application Nov. 19, 1973, Ser. No. 417,314

Int. Cl. F16h *19/04*

U.S. Cl. 74—30 4 Claims



1. A camper loading and securing system comprising:

a transportable bed;

two pinion housings attached to the transportable bed at spaced side-by-side locations;

a rack-engaging pinion mounted for rotation upon its axis within each housing, each pinion comprising means accommodating independent unlimited rotation thereof in both forward and reverse directions and at least one mechanical power coupling which is actable directly upon the axis to rotate each pinion; and

means selectively connecting the pinions for unitary movement.

3,874,245

DRIVE APPARATUS FOR ROTARY SPINDLES

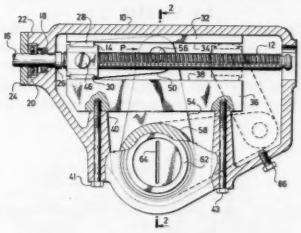
Jan Kral; Kurt Kerlin; Heldemar Gratza, all of Dolni Benesov, and Alfons Harazim, Stepankovice, all of Czechoslovakia, assignors to Moravskoslezska armaturka, narodni podnik, Dolni Benesov, Czechoslovakia

Filed Feb. 5, 1974, Ser. No. 439,704

Claims priority, application Czechoslovakia, Feb. 12, 1973, 995-73

Int. Cl. F16h *27/02*

U.S. Cl. 74—89.15 9 Claims



1. Drive apparatus for operating rotary valve spindles comprising a body, an elongated screw rotatably mounted in said body, a feed nut located on said screw, means for guiding said feed nut for movement on said screw in an axial direction and lever means adapted to connect said feed nut and the spindle of the rotary valve so as to convert said axial movement of said feed nut into rotary movement of said valve, comprising first and second rail means each having a planar surface adapted to engage opposite faces of the feed nut, and means for adjustably mounting at least one of said rail means to maintain the planar surfaces parallel to each other whereby said feed nut may slide in an axial direction and be prevented from rotating about said screw.

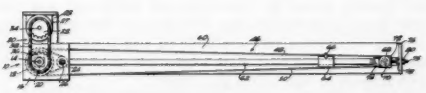
3,874,246

CABLE PULLEY DRIVE DEVICE

Boyd Woodard, 6995 N.W. 32 Ave., Miami, Fla. 33147

Filed Feb. 25, 1974, Ser. No. 445,555

Int. Cl. F16h *7/00*, *7/10*

U.S. Cl. 74—224 7 Claims

1. A pulley drive device comprising:

A. a main pulley rotatably mounted between a pair of fixed, opposed side plates including,

1. a pair of relatively closely spaced apart grooves about its peripheral face;

B. a relatively small cable transfer pulley, rotatably journaled between said side plates, in a spaced relation to said main pulley, including,

1. a single groove about its peripheral face;

C. a drive means such as a cable, first, passed forwardly around the first groove of said pair, second, passed rearwardly around said single groove of said cable transfer pulley, and, third, passed forwardly around the second groove of said pair, said cable terminating in a pair of cable runs extending rearwardly from said main pulley;

D. a reversible motor drive means, drivingly connected to said main pulley;

E. each of said pair of grooves being generally U-shaped in cross section with opposed side walls diverging somewhat outwardly from a rounded bottom portion, the diameter of said cable being such that it normally rides well up in each groove; when a load or tension is applied to one or both of said cable runs, said cable being drawn deeper into each of said pair of grooves.

3,874,247

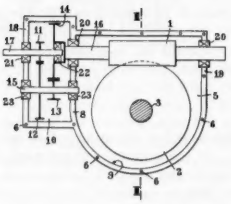
WORM REDUCING GEAR

Francois Durand, 108 Bld. Carnot, 78 Le Vesinet, and Lucien Vezole, 51, Bld. de Bellevue, 91 Draveil, both of France

Filed Oct. 17, 1973, Ser. No. 407,217

Int. Cl. F16h *1/16*

U.S. Cl. 74—425.5 **6 Claims**



1. A gear transmission comprising a case; a first shaft extending between the exterior and the interior of said case; a second shaft in said case and extending parallel to said first shaft; a worm gear coaxial with said first shaft; a third shaft extending between the interior and the exterior of said case and spaced from axis of said worm gear; a crown wheel ridigly connected to said third shaft and meshing with said worm gear; a primary gear train including a first gear wheel rigidly connected to said first shaft, and a second gear wheel connected to said second shaft and meshing with said first gear wheel; an intermediate gear train including a third gear wheel connected to said second shaft, and a fourth gear wheel rigid with said worm gear and meshing with said third gear wheel; and bearing means for mounting said shafts and said worm gear in said case for rotation, said bearing means including a bearing accommodated internally of said fourth gear wheel and mounting said first shaft therein for differential rotation with respect to said fourth gear wheel.

3,874,248

SHIFT MECHANISM FOR TRANSMISSIONS

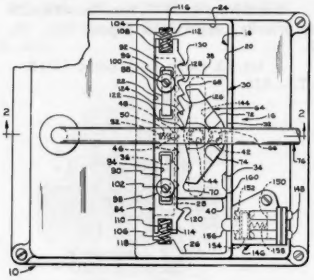
Hans Hauser, and Ronald N. Jones, both of Fredericktown, Ohio, assignors to The J. B. Foote Foundry Co., Fredericktown, Ohio

Filed July 18, 1973, Ser. No. 380,169

Int. Cl. G05g *9/06*

U.S. Cl. 74—475 **30 Claims**

1. Mechanism for shifing a transmission comprising a movable shift lever, a pawl carrier movable in a path and having a plurality of positions corresponding in number to the number of in-gear and neutral positions of the transmission, means for guiding said pawl carrier in the path, pawl means movably mounted relative to said carrier and engageable by said shift lever for movement relative to said carrier, and a stop member for limiting continuous movement of said shift lever in one



direction, which movement is sufficient to shift the transmission to the next position.

3,874,249

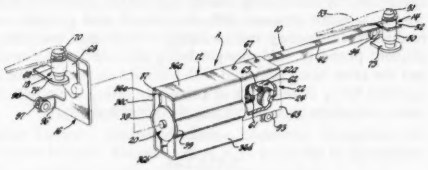
UNITIZED WIPER SYSTEM

Keith H. Carpenter, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 21, 1973, Ser. No. 417,767

Int. Cl. F16h *57/02*

U.S. Cl. 74—606 **1 Claim**

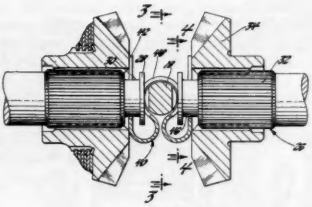


1. A unitized windshield wiper assembly adapted to be mounted as a unit to a vehicle body comprising: a one-piece elongated frame having a motor housing portion adjacent one end thereof; a first drive pivot means supported adjacent the other end of the frame, an end piece secured to the motor housing portion at the end remote from the first drive pivot means, said end piece supporting a second drive pivot means; an electric motor supported by said motor housing portion; a gear reduction means supported by said frame and drivingly connected with the electric motor, said gear reduction means including an output shaft, a crank arm fixed to said output shaft, a drive transmission means operatively connected to said crank arm and said first and second drive pivot means for oscillating the latter in response to rotation of the crank arm, and spaced mounting openings on said frame and an end piece to enable the same to be mounted to the vehicle via fasteners, the improvement being that said frame including the motor housing portion is made from a single piece sheet metal which is stamped and bent to form a generally L-shaped side wall having a thin narrow arm to which the first drive pivot means is supported at the outer end thereof and a wide rectangular base leg, a reversely bent upper flange extending along substantially the entire upper edge of the side wall and providing structural rigidity therefor, a rectangular section extending from the end of the base leg at the lower end thereof and bent to form a peripherally continuous motor housing portion having a central through opening for receiving the electric motor adjacent an end portion thereof with an upper wall reversely bent and overlapping the flange, and a second flange along the lower edge of the base leg intermediate the rectangular section and the narrow arm to provide lower structural rigidity for the frame.

3,874,250
LIMITED SLIP DIFFERENTIAL

Morris J. Duer, Lansing, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 24, 1973, Ser. No. 409,334
Int. Cl. F16h *1/44*
U.S. Cl. 74—711 **1 Claim**



1. In a limited slip differential including a rotatable casing, a pair of output members rotatably received in said casing and adapted to be driven thereby, a pair of side gears in said casing, each of said side gears being adapted to rotate with one of said output members, a pinion shaft fixedly carried in said casing, a pair of pinion gears rotatably carried on said pinion shaft and intermeshing with said side gears such that rotation of said output members relative to one another causes rotation of said side gears relative to said casing, and friction clutch means carried between said side gears and said casing and loadable to frictionally resist rotation of said side gears relative to said casing, the improvement comprising:

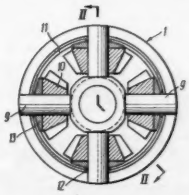
a clutch loading spring and output member retaining device, said device comprising a pair of parallel flat metal plates and a resilient center plate joining corresponding sides of said parallel plates, said resilient center plate being curved between said parallel plates in a generally omega-shaped configuration to form an unclosed generally cylindrical portion between said parallel plates, said device being placed in said casing with one of said parallel plates abutting each said side gear and said cylindrical portion surrounding said pinion shaft, said resilient center plate being compressed to bias said parallel plates against said side gears and thus load said clutch means, each of said parallel plates having a slot extending inward from the side opposite said resilient center plate, said slots being adapted to engage said output members for retention thereof in said casing.

3,874,251
BEVEL GEAR DIFFERENTIAL

Igor Nikolaevich Lapitsky, ulitsa B. Khmelnitskogo 51, kv. 46; Bogdan Vasilievich Sabadakh, ulitsa Plekhanova 3a, kv. 23; Gennady Grigorievich Sumtsov, ulitsa Ya. Kolasa 50, korpus 2, kv. 42; Ivan Pavlovich Xenevich, ulitsa O. Koshevogo 13, kv. 6; Anatoly Tikhonovich Skoibeda, ulitsa Tolbukhina, 23, kv. 60; Leonid Isaakovich Venzel, ulitsa Sovkhoznaya, 25, kv. 1; Viktor Sergeevich Tolstoguzov, ulitsa Koltsova 4, korpus 2, kv. 75; Boris Yakovlevich Shneiser, ulitsa Gritsevtsa, 13, kv. 31, and Alexandr Viktorovich Korolkevich, ulitsa Ya. Rainisa 19, kv. 35, all of Minsk, U.S.S.R.

Filed May 15, 1973, Ser. No. 360,475
Int. Cl. F16h *1/40, 1/44*
U.S. Cl. 74—713 **8 Claims**

1. A bevel gear differential comprising: a housing; a driving rotatable differential casing accommodated in said housing; a spider having a group of axially disposed axles, said spider being accommodated in said casing to rotate therewith; bevel satellites mounted at the ends of said radially disposed axles; a pair of coaxially and concentrically disposed output shafts journalled in said housing, the inner ends of said output shafts being arranged inside said casing adjacent each other; bevel pinions each mounted on the respective ends of said output shafts and being in constant mesh with said satellites; said differential casing being provided with a ring the inner surface of the ring engaging the outer end faces of said satellites, said ring being movable in a plane normal to the rotational axis of

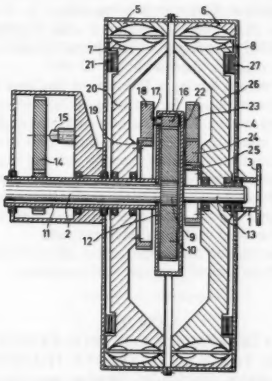


the differential casing and prevented from shifting relative to the differential casing along the rotational axis thereof, whereby the counterbalance of the thrust acting upon the satellites and of specific pressures developed in the zone of engagement between the bevel pinions and satellites is ensured.

3,874,252
GEARBOX

Vincent Begat, Essingestraket 32, Stockholm, Sweden (11266)

Filed Mar. 12, 1973, Ser. No. 340,033
Int. Cl. F16h *1/28*
U.S. Cl. 74—802 **7 Claims**



1. A gearbox with clutch, comprising, in combination:

a. an input shaft;

b. an output shaft; and

c. a gear shifting unit arranged between the input shaft and output shaft, the unit comprising:

i. a double planet gear train including a reverse planet gear and a forward planet gear;

ii. a sun wheel common to the reverse and forward planet gear and mounted on the output shaft, the planet gears arranged operating on the sun wheel;

iii. two clutches connected to the input shaft, and one connected to the forward planet gear and the other to the reverse planet gear;

iv. a planet carrier common to the planet gears and adapted for being locked by a ratchet means; and

v. ring pinions connected to the clutches and arranged engaging the planet gears for connecting the latter to their associated clutches, whereby the planet gears are connected to the input shaft by the clutches being engaged as desired.

3,874,253

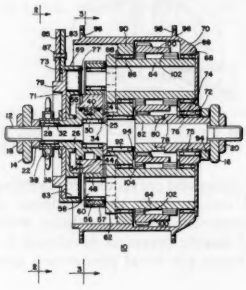
WADDINGTON DRIVE

Clive Waddington, 180 Euclid Ave., Stratford, Conn. 06497

Filed May 31, 1973, Ser. No. 365,510

Int. Cl. F16h *1/28*

U.S. Cl. 74—804 **22 Claims**



1. A stepless variable-stroke drive comprising:

an input element journaled for rotation and having a generally cylindrical cam means displaceable between a first position wherein its effective center is eccentric with respect to the axis of rotation of said input element and a second position wherein the effective center is closer to said axis;

an output element journaled for rotation;

at least one planet gear journaled in said output element;

a nonrotatable gear engaging said planet gear for providing a torque reaction therewith;

crank arm means having a follower at one end engageable with said cam means for pivoting cyclic movement of the crank arm means about the other end thereof;

a one-way clutch connecting the other end of said crank arm means to said planet thereby causing said planet to revolve about the rotational axis of said output element at an input-output speed ratio generally proportional to the distance of the effective center of the cam means from the axis of said input element; and

means responsive to the torque across said drive for displacing said cam means between said positions.

3,874,254

AUTOMATIC REMOTE CONTROL SYSTEM FOR HYDRAULIC TORQUE CONVERTER TRANSMISSIONS

Karl Gustav Ahlen, Stockholm, Sweden, assignor to S.R.M. Hydromekanik Aktiebolag, Stokholm, Vallingby, Sweden

Filed Sept. 28, 1973. Ser. No. 401,614

Claims priority, application United Kingdom, Sept. 29, 1972, 45200/72

Int. Cl. B60k *17/00;* **F16h** *47/00*

U.S. Cl. 74—856 **16 Claims**

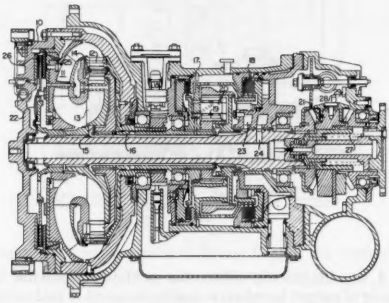
1. A remote control system for a transmission adapted for use in a vehicle and including a torque converter of the type having a pump member connected to an input shaft, a guide member and a turbine member connected to an output shaft, and wherein one of the pump or turbine members is releasable from its respective shaft, and including brake means for controlling the speed of rotation of the guide member, and a forward/reverse gear, said system comprising:

sensing means for sensing the ratio $n2/n1$ which is the rotational speed of the output shaft to the rotational speed of the input shaft,

pressure means for pressurizing fluid and selectively transmitting said pressurized fluid to main valve means for connecting and disconnecting said releasable member and said guide member brake means,

operating means responsive to the sensing means for controlling the main valve means for thus controlling the flow of said pressurized fluid through said main valve means to the releasable member and the brake means,

and including a remote control means for controlling the operating means, said remote control means located



remote from the transmission and adapted to be operated by the driver of the vehicle and movable to a plurality of positions for automatically operating the operating means to connect or disconnect the releasable member, connect or disconnect the brake means and to select either forward or reverse.

3,874,255

HYDRAULIC SPEED CHANGE CONTROL DEVICE

Teruo Minami, Hiratsuka, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

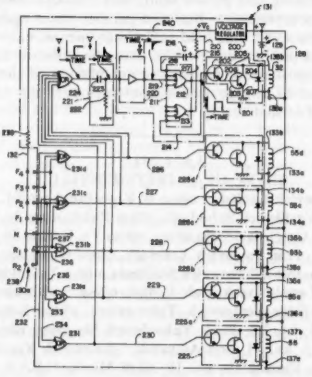
Continuation-in-part of Ser. No. 158,491, June 30, 1971. This application Jan. 15, 1973, Ser. No. 323,444

Filed Jan. 15, 1973, Ser. No. 323,444

Claims priority, application Japan, June 30, 1970, 45-56685; June 30, 1970, 45-56686

Int. Cl. B60k

U.S. Cl. 74—866 **10 Claims**



1. A fluid pressure control device of a transmission for use in a vehicle having selector valve means, a fluid torque convertor having first and second frictional engaging means for controlling hydraulically plural hydraulically operated frictional engaging means to produce plural speed change ratios, and a planetary gear mechanism, comprising a pressure control valve provided between a source of pressurized fluid and speed selector valve said control valve having a solenoid value controlled by an electronic control circuit connected to said source and having a pressure regulator valve provided within

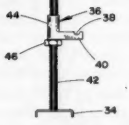
a cylindrical valve, a timing pressure valve provided for controlling said cylindrical valve and having first and second orifices provided therein and connected to constant pressure wherein said first orifice controls said cylindrical valve and a third movable orifice engaged with the outlet of said second orifice wherein the electric signal of the solenoid valve for moving the orifice is connected to the electric signal of a solenoid for operating said speed selector valve by the operation of said electronic control circuit which includes an OR-circuit, differential circuit and monostable multivibrator so that when a speed transfer signal is produced, said movable orifice is always opened, and the control back pressure of said cylindrical valve is quickly drained by utilizing the pressure difference between the second orifice of said timing pressure valve whereby the pressurized fluid to the clutch is lowered to initial regulator pressure, and thereafter said cylindrical valve is moved by the control current flowing from the first orifice to produce modulation pressure.

3,874,256

BICYCLE BRAKE CALIPER ADJUSTING TOOL

Charles R. Korb, Jr., 5562 S. Cedar, and John F. Boning, 6192 S. Crestview St., both of Littleton, Colo. 80120

Filed Sept. 26, 1973, Ser. No. 400,793
Int. Cl. B25b *11/00*; **F16d** *65/46*
U.S. Cl. 81—3 R **5 Claims**



1. A tool for adjusting bridle actuated dual caliper brakes comprising: a base comprising a U-shaped member configured to engage, be supported on and exert compressive forces on the calipers, guide means comprising an elongated threaded shank secured to said base and extending outwardly therefrom, carriage means mounted on and moveable along said shank and having a transversely extending bridle engaging portion to exert selected tensions on the bridle by increasing the effective length of the tool action between the calipers and the engaging portion of the bridle and manually-actuated positioning means operatively associated with said threaded shank and said carriage means for securing said bridle engaging means in a selected position of adjustment relative to said guide means.

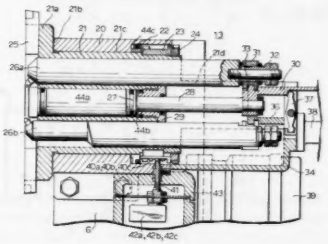
3,874,257

TOOL HEAD FOR A TURNING MACHINE

Yuji Hikota; Shizuki Yoshino, and Atushi Ohtani, all of Abikoshi, Japan, assignors to Hitachi Seiki Co., Ltd., Marunouchi, Tokyoto, Japan

Filed Mar. 6, 1974, Ser. No. 448,754
Int. Cl. B23b *29/32*
U.S. Cl. 82—36 A **1 Claim**

1. A tool head in a turning machine comprising:
- a turret supporting base mounted on a sliding base movable in parallel and at right angle to a main axial line spindle in respect to an axial line of a spindle,
- a drum-type turret provided on the supporting base so as to effect indexing around an axial line parallel to the main axial line of the supporting base,
- an outside diameter cutting tool provided at a front large-diameter portion of the turret,
- an inside diameter cutting tool provided movable in parallel to the rotating axial line and extending through the turret,
- a power driving device for the indexing of the turret,
- a power driving device which engages with one of the inside diameter cutting tools which is indexed and projects it



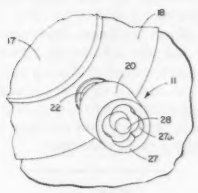
beyond the front end of the turret and returns it to its original position, and
- a power clamping device which effects clamping for determining the indexing position of the turret and clamping of the required inside diameter cutting tool.

3,874,258

KEYED ATTACHMENT DEVICE FOR VEHICLE WHEELS

Vincent J. Semola, Malibu, and Kenneth C. Droesbeke, Anaheim, both of Calif., assignors to Stallion Enterprises Inc., Los Angeles, Calif.

Filed May 21, 1973, Ser. No. 361,890
Int. Cl. B25b *13/06, 13/50*
U.S. Cl. 81—121 R **8 Claims**

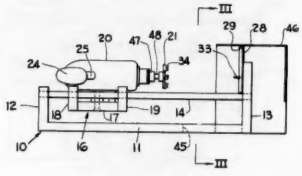


1. A keyed attachment nut for fastening a wheel to the hub of a vehicle, said hub having threaded studs extending therefrom, said nut being operable by a mating key device, said nut comprising:
- a base portion having a threaded aperture formed therein for engagement with the threaded portion of one of said studs, and
- a head portion having a top face, said face having a wall formed therein having an inner surface contoured in the form of a plurality of arcuate lobes providing a first predetermined coded configuration and a post formed therein in a second predetermined coded configuration, the spacing between the outer wall of the post and said inner wall surface forming a channel of non-uniform width therebetween,
- said key device having a wall portion which fits between the wall and post of said head portion in mating engagement with the inner surface of said head portion, said key device further having an aperture formed therein which fits snugly over the head portion post,
- whereby said key device can be utilized to rotatably drive said nut.

3,874,259
POTATO CUTTING MACHINE

James Chambos, Williamsville, N.Y.; James Whiteley, and S. Arthur Roxy, both of Sarasota, Fla., assignors to said James Whiteley and said S. Arthur Roxy to said James Chambos, Williamsville, N.Y.

Filed Apr. 9, 1973, Ser. No. 348,942
Int. Cl. B26d 3/08, 7/06, 4/80
U.S. Cl. 83—9 5 Claims

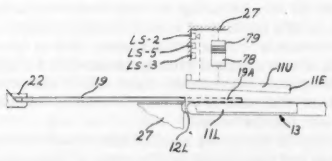


1. A vegetable cutter comprising a frame including a cutter support, means for presenting an article of vegetable to said cutter support comprising a carriage and means supporting said carriage for guided linear movement toward and away from said cutter support, a driving motor on said carriage including a driven shaft having vegetable engaging means at the end thereof toward said cutter support, said shaft being rotatable on an axis parallel to the direction of movement of the carriage, said cutter support including a series of parallel blades projecting toward said carriage and extending in a radial row with respect to the axis of said shaft to score said vegetable along concentric circles, and a slicing blade extending generally at right angles to said shaft axis and spaced toward said carriage from said cutter support for continuously slicing said scored portions during rotation of said shaft to form a series of helical strips of said vegetable, said carriage being movable manually to hold said vegetable against said cutter support during operation of said cutter to produce sliced strips of uniform thickness, said frame including a base and said cutter support extending upwardly at one end thereof, guide support means extending upwardly at the opposite end of said base, and a pair of horizontal, laterally spaced, parallel guide rods extending fixedly between said cutter support and said guide support, said carriage being mounted for free movement along said guide rods.

3,874,260
CORNER SHEARED BLANK CONVEYING APPARATUS AND METHOD

Gerald V. Roch, Indianapolis, Ind., assignor to Hurco Manufacturing Company, Inc., Indianapolis, Ind.

Filed Oct. 31, 1973, Ser. No. 411,335
Int. Cl. B26d 7/02
U.S. Cl. 83—27 6 Claims



1. A method of receiving and removing blanks sheared from a sheet in a shearing machine having a first lower blade, said method comprising the steps of:

moving a portion of the sheet over said lower shear blade onto a conveyor portion behind said blade;

clamping the sheet in front of the cutting edge of said blade;

depressing the conveyor portion;

closing a first upper blade with said lower blade to sever from the clamped portion of the sheet, the portion overhanging said depressed conveyor portion;

conveying away the severed portion on said conveyor portion;

maintaining the depressed conveyor portion at levels lower than said first upper blade at all times during closure of said blades;

opening said first upper blade from said first lower blade;

unclamping said sheet;

moving another portion of said sheet over said first lower shear blade and over said conveyor portion;

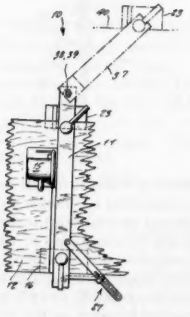
closing said upper blade with said lower blade to sever said another portion from said sheet; and

horizontally shifting said conveyor portion from a first position to a second position to enable said severed another portion to fall past said conveyor portion.

3,874,261
ROTARY SAW JIG

Gerald Atlee Murray, 7360 Bluestone St., Reno, Nev. 89502

Filed June 18, 1973, Ser. No. 370,806
Int. Cl. B27b 9/04
U.S. Cl. 83—471.3 2 Claims



1. In an electric saw jig for cutting a piece of lumber the combination of:

first and second spacer blocks each having lower and upper surfaces respectively to rest on a support surface and to support the lower surface of the piece of lumber to be sawn,

a guide strip having a longitudinal straight edge at one side thereof serving to guide an electric saw being moved across the lumber and which at one end is adapted to be secured upon the side of the piece of lumber to be sawn, a first clamp means connected at one portion thereof to said first spacer block above the lower surface thereof and having another portion adapted for engaging said guide strip adjacent one end portion thereof,

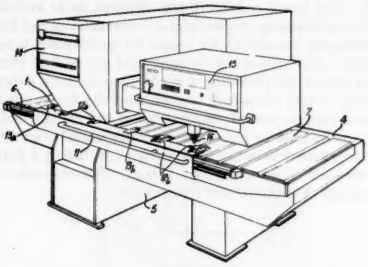
a second clamp means connected at one portion thereof to said second spacer block above the lower surface thereof and having another portion adapted for engaging said guide strip adjacent the other end portion thereof,

said first and second clamp means clamping the piece of lumber to be sawn between said spacer blocks and said guide strip at a location above the support surface at the lower surface of said first and second spacer blocks.

3,874,262
PUNCHING MACHINE OR THE LIKE

Paul Cailloux, La Varenne, Saint-Hillaire, France, assignor to Promecam Sisson-Lehmann, Saint-Denis (Seine Saint-Denis), France

Filed Apr. 13, 1973, Ser. No. 350,894
Claims priority, application France, Apr. 18, 1972, 72.13537; Apr. 18, 1972, 72.13538
Int. Cl. B26d *5/16;* **B25f** *1/14*
U.S. Cl. 83—549 **6 Claims**



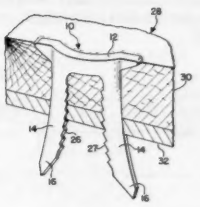
1. A punching machine comprising a frame; a platen above said frame movable in two directions which are normal to each other; means connected to said frame and said platen for guiding the latter movable in said directions; means on said platen for holding a workpiece to be punched and a templet in fixed position and laterally spaced from each other for movement with said platen in said directions; a series of punches of different cross-sections having parallel axes located spaced from each other in a common plane substantially normal to said platen; means fixed to said frame for guiding each of said punches movable from a rest to an operating position for punching a hole in a workpiece carried by said platen; striking means movable in said common plane for alignment with a respective one of said punches and cooperating with a respective punch for moving the same from said rest to said working position; a stylus cooperating with said templet and mounted for movement in said common plane; and means for connecting said stylus with said striking means for adjusting the position of the latter in said plane in accordance with the position of said stylus, said connecting means maintaining said stylus and said striking means at a fixed distance from each other.

3,874,263
METAL PENETRATING STAPLE

Gerald D. Barth, Dundee, and Ralph E. Jennings, Glen Ellyn, both of Ill., assignors to Illinois Tool Works, Inc., Chicago, Ill.

Division of Ser. No. 230,365, Feb. 29, 1972, Pat. No. 3,800,653. This application Jan. 9, 1974, Ser. No. 432,110
Int. Cl. F16b *15/06*
U.S. Cl. 85—13 **5 Claims**

1. A metal-penetrating staple formed from sheet stock material including a crown portion and pair of legs extending therefrom, the legs each including an entering point formed from a pair of unequal camming surfaces intersecting at an apex, one edge of each leg including means for locking the staple in an associated workpiece, the longest camming surface of the entering point being located on the same edge of the leg on which the locking means is located, the staple being formed of a resilient material which enables the locking means to spring into locking position when the staple is driven through a metal workpiece, the axial dimensions of the crown section and legs lying in a common arcuate cross-sectional path when viewed in planes generally perpendicular to the longitudinal axis of the staple, said crown and leg portions being generally the same thickness, clamping ears formed integral with the crown and extending outwardly therefrom,

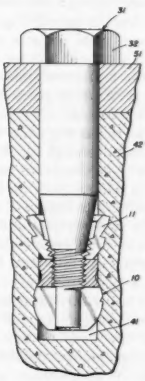


said ears lying in a common longitudinal plane which intersects the arcuate path to distribute the clamping load in a plane different than the place of the penetration of the legs.

3,874,264
ANCHOR BOLT ASSEMBLY

Constantine D. Polos, 1955 Cheshire Ln., Lombard, Ill. 60187

Filed Feb. 16, 1973, Ser. No. 333,159
Int. Cl. F16b *13/06*
U.S. Cl. 85—84 **11 Claims**



1. An expansible anchor plug adapted for use in a blind hole in a hard material, said plug comprising a tubular body having an upper cylindrical section and a lower generally spherical bulb section, said bulb section having a diameter larger than that of said cylindrical section, the outer surface of said bulb section having means adapted to grip the wall of said hole and impede rotation of said plug in said hole;

said cylindrical section being provided with a plurality of longitudinal slots extended downwardly from the top of said plug for permitting partial radial expansion of said cylindrical section;

said bulb portion being provided with a plurality of longitudinal slots extending upwardly from the bottom of said plug defining a plurality of radially resiliently deformable portions for permitting resilient compression of said bulb section to a diameter equal to that of said cylindrical section;

an intermediate section of said plug between said cylindrical section and said bulb section being unslotted;

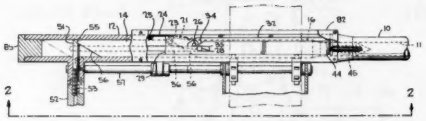
the bore of said plug being provided with internal threads in said unslotted intermediate section.

3,874,265

AMMUNITION FEED AND BOLT LOCK MECHANISM FOR A CLOSED BREECH ROCKET GUN

George R. Kruzell, 301 Hotchkiss, Bay City, Mich. 48706

Filed Sept. 13, 1973, Ser. No. 397,200
Int. Cl. F41f *3/04, 9/00*
U.S. Cl. 89—1.801 8 Claims



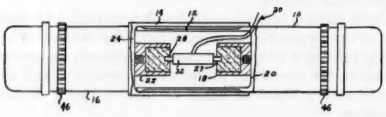
1. In a closed breech rocket gun including a barrel having a bore extending therethrough and communicating at its rearward end with a receiver through a breech opening, said receiver defining a sealing surface around said breech opening, a bolt guided for projection and retraction movement in said receiver respectively toward and away from said breech opening and formed with a sealing surface for flush sealing engagement with said receiver sealing surface in the forwardly projected position of said bolt, a bolt operating pin on said bolt, a bolt lock element resiliently mounted on said receiver for movement inwardly of said receiver into locking engagement with said bolt operating pin and outwardly of said receiver out of engagement with said bolt operating pin, a cam plate slidably guided on said receiver for movement parallel to said bolt movement and having a cam surface for engagement with said bolt lock element for moving it outwardly of said receiver when said cam plate retracts, said cam plate being operatively connected with said bolt for movement thereof, a gas cylinder and piston unit communicating with said barrel for the reception of pressurized gas therefrom for actuating said unit, linkage means operatively interconnecting said unit with said cam plate for retracting same incident to the firing of a round of ammunition through said barrel, resilient means urging said cam plate to its projected position, a plunger rod resiliently mounted on said receiver for transverse movement into and out of the path of movement of said bolt, a feed shaft rotatably mounted on said receiver and parallel thereto, an ammunition feed unit in engagement with said shaft for feeding a round of ammunition into said firing chamber upon rotation of said shaft, said plunger rod engaging said bolt each time said bolt retracts to thereby cause said rod to engage said shaft for intermittent rotation thereof each time said rod moves outwardly of the path of movement of said bolt, whereby said bolt lock element is unlatched as said cam plate retracts, and a round of ammunition is fed into said firing chamber as said bolt retracts and moves said plunger rod outwardly so as to rotate said shaft.

3,874,266

WEAPON DISPERSAL SYSTEM

Paul F. Peterson, Palos Verdes Peninsula, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 14, 1974, Ser. No. 433,174
Int. Cl. B64d *1/04*
U.S. Cl. 89—1.5 1 Claim



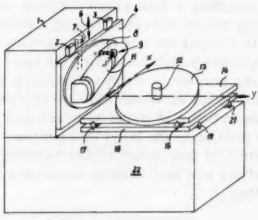
1. A weapon dispersal system for conventional bluff shaped bombs, comprising a bomb pair including a first bomb having a first cylindrical member secured to the end thereof and a second bomb having a second cylindrical member secured to the end thereof; said second cylindrical member being positioned within the first cylindrical member and forming a piston member within the first cylindrical member and adapted to form a separate device for the bomb pair; at least one propellant charge positioned within said cylindrical members; a plurality of vertical channel racks forming clip-in modules adapted to be secured in the bomb bay of an aircraft; means in said channel racks for securing a plurality of bomb pairs in each vertical channel rack; said securing means including means for selectively releasing the bomb pairs from the channel racks; said bomb pairs and said channel racks including means for maintaining proper lateral orientation of the bomb pairs leaving the channel racks; means for igniting said propellant charge; said means for igniting said propellant charge including means for providing a predetermined time delay in the ignition of said propellant charge, whereby the bomb pair will drop a predetermined distance below the aircraft before ignition; said means for maintaining proper lateral orientation of the bomb pair within the vertical racks including a pair of spaced toothed racks within the vertical channel racks and mating sprocket teeth on said bomb pair.

3,874,267

METHOD AND MACHINE FOR ACCURATE FORMATION OF TEETH ON ELLIPTICAL GEARS

Dieter Schwenke, Dunenweg 27, 205 Hamburg 80, Germany

Filed May 14, 1973, Ser. No. 360,133
Claims priority, application Germany, May 13, 1972, 2223507
Int. Cl. B23f *15/02*
U.S. Cl. 90—4 22 Claims

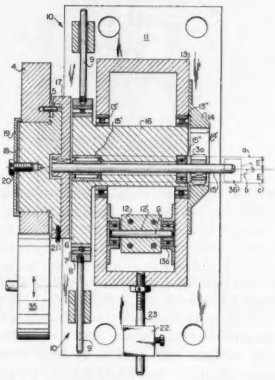


1. A method of forming gear teeth on elliptical blanks whose configuration is determined by the length of the major axes and the numerical eccentricities thereof, comprising the steps of driving a gear cutting tool so that said tool performs exclusively material removing movements; rotating an elliptical blank at a periodically varying angular speed; supporting said elliptical blank for movement along each axis of a two dimensional coordinate system; and changing the position of said blank relative to said tool in synchronism with said angular speed thereof along a path of coordinates of the axes of said two-dimensional coordinate system so that the pitch ellipse of said blank travels at a constant speed along the point of contact with a pitch line of said tool and that said pitch line is always tangential to said pitch ellipse at said point of contact.

3,874,268
DEVICE FOR GRINDING AND/OR MILLING WORKPIECES HAVING A TROCHOIDAL CROSS-SECTION

Franz Huf, Konstanz, Germany, assignor to Dornier System GmbH, Bodensee, Germany

Filed Sept. 19, 1973, Ser. No. 398,860
Claims priority, application Germany, Oct. 13, 1972, 2250172
Int. Cl. B23c *3/04*; B24b *5/00*
U.S. Cl. 90—20 **10 Claims**



1. A device for grinding and/or milling a workpiece having a trochoidal cross-section comprising tool means having an axis of rotation in a stationary plane extending normally with respect to the cross-sectional profile,

said workpiece being contacted by the tool means in a generatrix in a form-producing manner which, together with the axis of the tool means, constitutes a normal plane relative to the surface of the workpiece,

first gear unit means for effecting positive rotation of the workpiece and for reproducing the trochoidal curve,

follow-up gear unit means for guiding the workpiece into the relative position of the curve with respect to the normal plane,

said follow-up gear unit means comprising rotatably mounted disc means displaceable together with bearing support means therefor in the direction of a diameter extending parallel to the normal plane, and whose center is offset with respect to the axis of rotation of the workpiece by *n* times the trochoid eccentricity, where *n* corresponds to the ratio of the radii of the base circle to the rolling circle of the trochoidal shape,

mounting means whereby said first gear unit means is pivotal about a pivot axis parallel to the axis of rotation of the workpiece and extending through a simultaneous point of the trochoid,

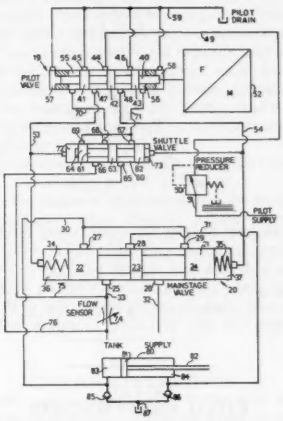
said pivot axis being positioned in the plane of displacement of the disc means, and

drive shaft means coupling said follow-up gear unit means and said first gear unit means.

3,874,269
HYDRAULIC ACTUATOR CONTROLS

Ronald Bernard Walters, Wembley, England, assignor to Sperry Rand Limited, London, England

Filed Nov. 1, 1973, Ser. No. 412,024
Claims priority, application United Kingdom, Nov. 8, 1972, 51471/72
Int. Cl. F15b *13/044*
U.S. Cl. 91—433 **14 Claims**



1. In combination: double-acting hydraulic actuating means having opposite sides and a device for controlling said hydraulic actuator means respectively to an electrical input signal, said device comprising supply and return lines, two actuator service lines connected to said opposite sides of said actuator means, a fluid pressure operated main valve, supply and return lines connected to said main valve for the supply of hydraulic fluid thereto and the return of hydraulic fluid therefrom, two actuator service lines connected between said main valve and said opposite sides of said actuator means, respectively, said valve having means to selectively and controllably connect said two actuator service lines to said supply and return lines, a flow pilot valve for controlling the main valve, said pilot valve including a spool for regulating the fluid pressure for operating the main valve, transducer means for producing a first force dependent upon said electrical input signal and for applying said first force to said spool, opposed piston means operative upon said spool, a flow sensor disposed in one of said supply and return lines for producing a pressure difference dependent upon the rate of fluid flow therein, and feedback means including shuttle valve means operable dependently upon the direction of fluid flow in said service lines for applying the pressuree difference produced across the flow sensor to the opposed piston means in a direction to apply to said spool a second force opposed to said first force.

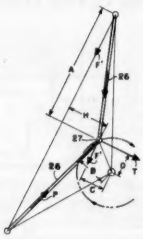
3,874,270
HYDRAULIC MOTOR

Howard M. Purcell, 2127 S. Belvoir Blvd., South Euclid, Ohio 44121

Filed Aug. 20, 1973, Ser. No. 389,878
Int. Cl. F01b *3/10*
U.S. Cl. 91—481 **4 Claims**

1. A hydraulic motor comprising a housing having inlet and outlet passages and having a plurality of radially extending cylinders; a crankshaft journaled in said housing having a crankpin; pistons reciprocable in the respective cylinders and having connecting rods linking the respective pistons to said crankpin; valve means operated in timed relation to rotation of said crankshaft to successively communicate the radially

outer end portion of each cylinder with said inlet and outlet passages with overlap of the communication of one cylinder and a succeeding cylinder with said inlet passage to produce a toggle force at said crankpin for increased motor torque and efficiency; said valve means communicating the radially outer end portion of one cylinder with said inlet passage prior to and



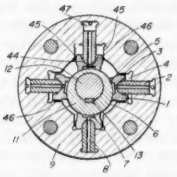
after said crankpin reaches top dead center position thereof and communicates the radially outer end portion of a preceding cylinder with said inlet passage until said crankpin passes bottom dead center position thereof whereby a toggle force is imposed on said crankpin during the overlap of the communication of said one and preceding cylinders with said inlet passage.

3,874,271

RADIAL PISTON MACHINE

Karl Eickmann, 2420 Isshiki, Hayama-machi, Kanagawa-ken, Japan

Filed Jan. 8, 1973, Ser. No. 322,086
Claims priority, application Austria, Jan. 7, 1972, 137/72
Int. Cl. F04b *1/06*
U.S. Cl. 91—491 **9 Claims**



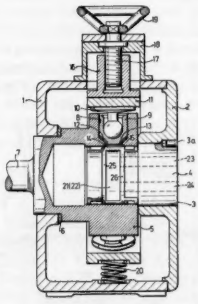
1. In a radial piston machine, a combination comprising a housing; a fluid handling body member provided in said housing and having substantially radially extending cylinders; an actuator member provided in said housing and having an endless guide surface, one of said members surrounding the other of said members; pistons reciprocably mounted in said cylinders and defining with said body member variable-volume working chambers remote from said guide surface, said chambers forming part of the respective cylinders and having inlets for admission and outlets for evacuation of a fluid medium; piston shoes associated with said pistons and slidable along said guide surface in response to rotation of one of said members relative to the other of said members to thereby reciprocate said pistons in the respective cylinders, at least a portion of each of said shoes having a polygonal cross sectional outline and said body member having polygonal recesses receiving said portions of said shoes with sufficient clearance to at least temporarily afford to said portions of said shoes the freedom of limited tilting movement in at least two different directions so as to enable said shoes to follow said endless guide surface of said actuator member while the machine is in operation, said pistons and said shoes being provided with normally abutting complementary curved surfaces having constant radii of curvature so as to enable said shoes to pivot on the respective pistons; and confining means for retaining said portions of said shoes in the respective recesses.

3,874,272

RADIAL PISTON MACHINE

Paul Bosch, Ludwigsburg, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed July 18, 1973, Ser. No. 380,164
Claims priority, application Germany, July 22, 1972, 2236125
Int. Cl. F01b *13/06*
U.S. Cl. 91—498 **14 Claims**



1. In a radial piston machine, a combination comprising a rotary cylinder block having a cylindrical external surface and radially extending cylinder bores including end portions terminatins in said internal surface; and a valve having a cylindrical external surface surrounded by said internal surface, a high-pressure chamber and a low-pressure chamber provided in said external surface, said chambers being in register with and being swept seriatim by successive end portions when said block rotates relative to said valve and said external surface including two portions constituting lands between said chambers, said external surfaces further having at least two recesses in each of said lands, offset in a.ial direction of said block relative to said chambers and respectively located to opposite sides of the path of the end portions of successive cylinder bores, each of said recesses being in temporary communication with that cylinder bore whose end portion travels in the region of the respective land.

3,874,273

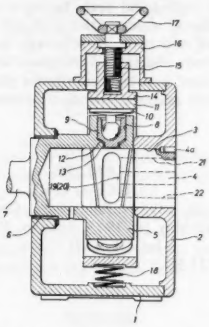
PINTLE FOR RADIAL PISTON MACHINES

Gerhard Nonnenmacher, Korntal, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Sept. 28, 1973, Ser. No. 401,943
Claims priority, application Germany, Oct. 2, 1972, 2248312
Int. Cl. F01b *13/06*
U.S. Cl. 91—498 **18 Claims**

1. In a radial piston machine wherein a cylinder block having a plurality of radial cylinders for reciprocable fluid-pressurizing pistons rotates about a stationary pintle whose peripheral surface has high- and low-pressure control chambers located substantially diametrically opposite and separated from each other by first and second lands one of which is adjacent to pistons assuming their inner end positions, wherein successive cylinders communicate alternately with said high- and low-pressure chambers when said cylinder block rotates. wherein said peripheral surface has only two circumferentially extending endless recesses flanking said control chambers and respectively defining therewith a pair of first and a pair of second sealing projections which are respectively adjacent to said high- and low-pressure chambers, and wherein the fluid and the pistons in said cylinders produce a

first resultant force acting upon and tending to move said cylinder block toward said pintle in the region between said one land and the center of said high-pressure chamber, the improvement which consists in that the width of said first sealing projections, as considered in the axial direction of said pintle, varies in the circumferential direction of said peripheral surface and the fluid which leaks from said high-pressure chamber substantially axially of the pintle toward said recesses



produces pronounced pressure fields between said first sealing projections and said cylinder block whereby said pronounced pressure fields resist the movement of said cylinder block toward said pintle with a second resultant force, the point of attack of said second resultant force coinciding with or being closely adjacent to the point of attack of said first resultant force as a result of variation of the width of said first sealing projections.

3,874,274

RADIAL PISTON MOTOR

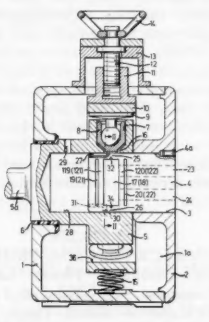
Rainer Knoblauch, Stuttgart, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Oct. 23, 1973, Ser. No. 408,796

Claims priority, application Germany, Oct. 21, 1972, 2251792

Int. Cl. F01b *13/06*

U.S. Cl. 91—498 **9 Claims**



1. In a radial piston motor, a combination comprising a rotary cylinder block having a cylindrical internal surface, radially extending cylinders and ports extending between said cylinders and said surface; an eccentric annular slide block surrounding said cylinder block; pistons reciprocably mounted in said cylinders and having outer end portions frictionally engaging said slide block so as to move radially between inner and outer end positions in response to rotation of said cylinder block; and a pintle having a cylindrical peripheral surface surrounded by said internal surface and provided with high- and low-pressure control chambers located diametrically opposite each other and first and second lands separating said chambers from each other, one of said lands being in register with successive pistons assuming said inner end positions and the other of said lands being in register with successive pistons assuming said outer end positions, the width of said lands — as considered in the circumferential direction of said pintle — being such that a port which registers with a piston assuming one of said end positions is completely sealed from said control chambers and remains sealed from at least one of said control chambers while said cylinder block rotates relative to said pintle through an angle α whose magnitude is a function of the friction coefficient between said slide block and said outer end portions of said pistons, each of said pistons further comprising a second end portion articulately connected with the respective outer end portion and the starting force F of said outer end portions of said pistons during starting of said cylinder block equaling

$$F = 0.785\ d_K^2\ p/\cos(\arcsin(e/R \sin\alpha)) \cdot \{\tan(\arcsin(e/R \sin\alpha)) - \mu(1-\epsilon)\} \geqq 0$$

wherein d_K is the diameter of a piston, p is the fluid pressure in said high-pressure control chamber, e is the eccentricity of said slide block, R is the radius of the circular path along which the centers of articulate connections between said end portions and said second portions of said pistons orbit about said pintle, μ is the friction coefficient, and ϵ is the hydrostatically relieved area of each of said end portions.

3,874,275

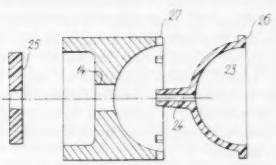
CAM FOLLOWER PISTON

Sinclair Upton Cunningham; James Rutherford Wells, and Donald Firth, all of Glasgow, Scotland, assignors to National Research Development Corporation, London, England

Division of Ser. No. 177,265, Sept. 2, 1971,. This application May 10, 1973, Ser. No. 358,989

Int. Cl. F16j *1/08, 1/10*

U.S. Cl. 92—248 **1 Claim**



1. A piston comprising:

a freely rotating cam follower ball for following a cam surface in a hydrostatic machine by reciprocatory motion of the ball in a cylinder bore of such a machine;

a piston body for reciprocatory travel along a cylinder bore, said piston body having at one end a working face to be acted on by the working fluid of a hydrostatic machine, and at the other end a bowl-shaped seating for said ball, said piston body exposing a portion of said ball protruding from said piston body for engaging a cam surface, said piston body having an aperture extending from said seating to said working face;

an insert of low friction synthetic plastics material positioned between said cam follower ball and said seating in said piston body, said insert having an internal bearing surface for said ball and an external surface mating with and supported by said bowl-shaped seating,

means for securing said insert in said piston body, said means comprising a portion of said insert extending into said aperture in said piston body, flange means securing said insert portion to said piston body, and interdigitating castellations around the perimeter of said seating and the perimeter of said insert, said castellations comprising a plurality of lug portions on said insert extending out-

wardly relative to the axis of the piston body, and a corresponding plurality of lug portions on said piston body interdigitating with said lug portions of said insert.

3,874,276

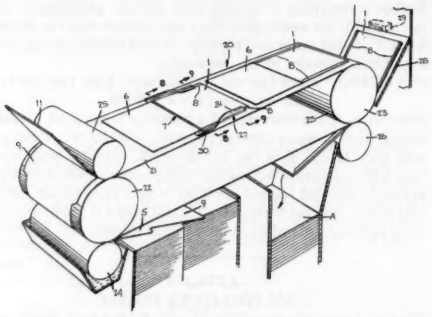
APPARATUS FOR MAKING PHONOGRAPH RECORD ALBUM OR SIMILAR ITEM

Rudolph A. Froehlig, College Point, N.Y., assignor to Modern Album and Finishing Co., Inc., College Point, N.Y.

Division of Ser. No. 280,053, Aug. 11, 1972. This application Nov. 21, 1973, Ser. No. 418,086

Int. Cl. B31b *41/26*

U.S. Cl. 93—13 **11 Claims**



1. A mechanism for forming a container which comprises means for wrapping an outer blank having a pair of panels connected together by a fold line around an inner jacket having a pair of panels adhered together, means for adhering a first panel of the blank to a first panel of the jacket, means for folding the second panel of the blank around said fold line along an edge of the jacket, means for adhering the said second panel of the blank to the second panel of the jacket, flaps extending from the first panel of the blank and means provided for the said side flaps to be bent over the side edges of the first panel of the jacket before the second panel of the blank is folded, means provided to move the jacket in an opposite direction after the first panel is adhered, pressure means are provided to cause the second panel to be folded, and stationary means for positively directing the jacket to said pressure means.

3,874,277

APPARATUS FOR PREPARING MINERAL WATER

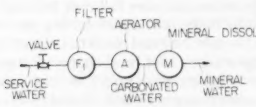
Kazunori Sonetaka; Atsushi Nishino, and Hiroshi Kumano, all of Osaka, Japan, assignors to Matsushita Electric Industrial Company, Osaka, Japan

Filed June 27, 1973, Ser. No. 374,125

Claims priority, application Japan, June 28, 1972, 47-65255; June 18, 1972, 47-65256; June 18, 1972, 47-65257; June 28, 1972, 47-56258; July 12, 1972, 47-70124; July 12, 1972, 47-70125; Aug. 2, 1972, 47-77906

Int. Cl. A23i *1/00*

U.S. Cl. 99—323.1 **12 Claims**



1. Apparatus for preparing mineral water, comprising a carbonator for dissolving carbon dioxide gas under pressure into water and a dissolver for dissolving at least one mineral carbonate soluble in acid but substantially insoluble in water, the carbonator having a mixing chamber, the feeding of water and carbon dioxide gas thereto and the discharge of carbonate water therefrom being governed by a single manually operable valve member, and means to adjust the the pressure of carbon dioxide gas to be fed to said mixing chamber at two stages so as to obtain a predetermined concentration of carbonated water under various pressures of water, said dissolver comprising a generally cylindrical body having a carbonated water inlet and a mineral water outlet adjacent one end and the opposite end of said body, respectively, a porous plate disposed in said body and spaced from said inlet a layer of said carbonate disposed between said porous plate and said outlet and a filter cloth assembly disposed between said layer and said outlet.

3,874,278

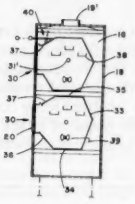
COOKING UNIT

William H. Groce, 1318 N. Poinsett St., Greer, S.C. 29651

Filed May 10, 1973, Ser. No. 358,995

Int. Cl. A47j *37/04*

U.S. Cl. 99—421 H **5 Claims**



1. An improved cooking unit comprising:

a. a housing, said housing having a plurality of walls defining same, said housing having a smoke outlet at an upper end thereof, said housing further having a plurality of doors in one of said walls;

b. a plurality of enclosed fire boxes received within said housing and secured thereto behind said doors, walls of said fire boxes combining with walls of said housing to define smoke channels therebetween, said fire boxes having smoke vents in said walls, each said fire box having a source of heat therein and a rotatable food support received thereabove, a top wall of said fire boxes adjacent said door having a portion thereof hinged for pivotal movement away from said fire boxes to divert smoke from said fire boxes into said smoke channels and away from said door, said hinged wall portion having means secured thereto for movement of same as desired; and

c. drive means for said rotatable food supports.

3,874,279

APPARATUS FOR TREATING PROTEIN FIBERS

Takashi Sakita, Yokohama; Hiroshi Kanda, Zushi, and Yasumasa Yamagami, Sagamihara, all of Japan, assignors to Nisshin Seiyu Kabushiki Kaisha, Tokyo, Japan

Filed June 27, 1972, Ser. No. 266,679

Claims priority, application Japan, Mar. 21, 1972, 47-28275

Int. Cl. A23J *3/00*

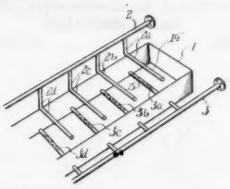
U.S. Cl. 99—534 **6 Claims**

1. An apparatus for treating a plurality of continuous protein fibers with a treating fluid comprising

an elongated receptacle having opposite side walls, opposite end walls and a bottom for containing the treating fluid; drive means at the opposite ends of the receptacle for moving a plurality of continuous protein fibers longitudi-

nally through the receptacle such that the protein fibers are immersed in the treating fluid;

a plurality of raised supports having rounded upper support surfaces disposed transversely across the receptacle and longitudinally spaced within the receptacle for slidingly supporting the plurality of fibers; and



a plurality of gas ejecting nozzles longitudinally spaced along the bottom of the receptacle to eject gas into the treating fluid;

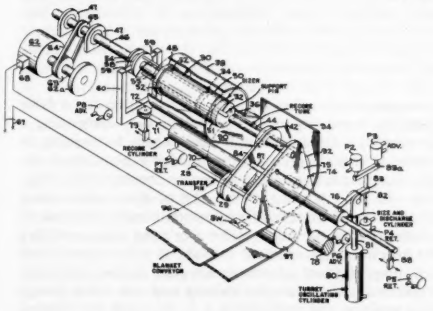
said plurality of raised supports and plurality of gas ejecting nozzles tending to raise the plurality of protein fibers upwardly within the receptacle and to prevent entanglement and twisting of the protein fibers.

3,874,280

PINEAPPLE SIZING AND RECORING

Leslie Vadas, Los Gatos, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed Apr. 27, 1973, Ser. No. 355,258
Int. Cl. A23n *3/12*
U.S. Cl. 99—544 **14 Claims**



1. Apparatus for processing contour peeled pineapple spheroids that have been precored to leave an unmutilated sleeve of core material; said apparatus comprising a turret having a transfer pin for supporting the spheroid by its precore running along the lower edge of said inspection conveyor, said edge trimming means comprising a knife disposed between said blanket guide rail and the inspection conveyor.

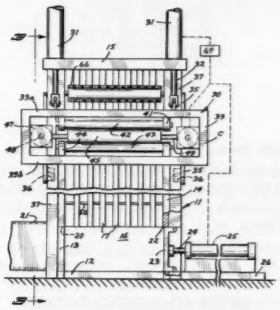
3,874,281

AUTOMATIC BATT PACKER AND METHOD OF PACKING

Joseph R. Conner; George E. Mayer, and Thomas F. Shovlin, all of Minneapolis, Minn., assignors to Bemis Company, Inc., Minneapolis, Minn.

Filed May 25, 1973, Ser. No. 363,964
Int. Cl. B30b *1/32*
U.S. Cl. 100—35 **24 Claims**

1. In the method of compressing a plurality of batts into a bale load in a loading chamber of a compression packer having a first plate defining one end of the chamber, a frame portion defining the opposite end of the chamber, a movable press plate and precompression fingers, comprising extending the press plate into the chamber between the first plate and the frame portion at a location substantially more closely adjacent the frame portion than the first plate, conveying a first plurality of uncompressed batts, one after the other, into the loading chamber between the frame portion and the press plate extending in the chamber while moving the press plate toward the first plate, thence extending the precompression fingers into the chamber between the frame portion and the first plate at a location more closely adjacent the frame portion than the first plate and opposite the first plurality of batts from the first plate, conveying a second plurality of uncompressed batts, one after another, into the loading chamber between the precompression fingers extended into the chamber and the frame portion while moving the precompression fingers toward the first plate to precompress the first plurality of batts, prior to the completion of the loading of the second



plurality of batts, retracting the press plate from the loading chamber, extending the movable press plate into the loading chamber between the second plurality of batts and the frame portion after the second plurality of batts have been conveyed into the chamber, conveying a third plurality of batts into the loading chamber between the frame portion, and the press plate and the second plurality of batts while moving the press plate toward the first plate to fully compress the first and second plurality of batts, after the first and second plurality of batts have been fully compressed between the first plate and press plate, stopping the movement of the press plate toward the first plate and then ejecting the fully compressed first and second plurality of batts from the loading chamber, and retracting the precompression fingers from the loading chamber prior to the ejection step and subsequent to the last mentioned extension of the press plate into the loading chamber.

3,874,282

DOMESTIC REFUSE COMPACTOR

Keizi Oouchi, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 23, 1973, Ser. No. 390,707
Claims priority, application Japan, Aug. 30, 1972, 47-86188
Int. Cl. B30b *15/14*
U.S. Cl. 100—53 **4 Claims**

1. A safety key switch device comprising:

microswitch means,

locking means, and

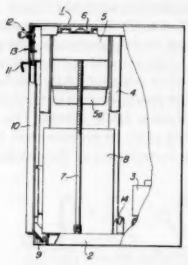
a cam member installed in the key switch device in such a manner that it moves upon actuation to a position which simultaneously closes the microswitch means and actuates the locking means,

wherein said locking means includes return spring means for pressing an end of said locking means against the cam member,

wherein said cam member has a configuration which is longer in one of its length and its width,

wherein said key switch device includes means to stop the cam member in said position slightly beyond its dead

center when the key switch device is actuated, so that the spring means operates to avoid movement of the cam out of said position, and



wherein the device is operationally connected with a machine in such a manner that the locking means locks a door of the machine when actuated and the microswitch means actuates an electric motor drive of the machine when closed.

3,874,283

SHEET SQUEEZING DEVICE

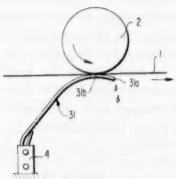
Shunichi Igarashi, Tokyo, and Takeshi Okano, Nishinomiya, both of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 27, 1973, Ser. No. 354,973

Claims priority, application Japan, Apr. 27, 1972, 47-42363

Int. Cl. B30b *9/20, 3/02*

U.S. Cl. 100—121 **4 Claims**



1. A device for squeezing a liquid carrying sheet material comprising a roller rotatable about a fixed horizontal axis, means for driving said roller, a resilient leaf member supported at the lower end thereof beneath said roller and having an upper end portion in pressure contact with the lower surface of the roller, sheet material being directed between the roller and the leaf member and being moved by contact with said roller, the upper end of the leaf member being directed rearwardly with respect to the advance of said sheet material passing between the roller and the leaf member, and the upper end portion of said leaf member being curved so that the lower surface of said roller is in contact with the upper end portion of the leaf member at a position slightly remote from the upper end thereof, and wherein the upper end portion of said leaf member is curved rearwardly and downwardly in the direction of movement of said sheet material, and wherein the leaf member contacts the roller along a line in vertical alignment with the horizontal axis of the roller.

3,874,284

SELECTIVELY PRINTING ROTARY DUPLICATOR

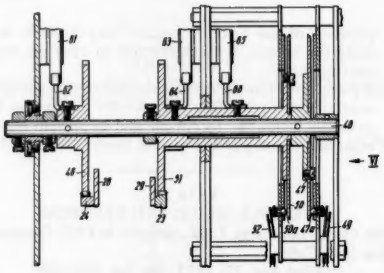
Gerhard Ritzerfeld, Schorlemer Allee 14, 1000 Berlin 33, Germany

Filed Apr. 18, 1973, Ser. No. 352,299

Claims priority, application Germany, Apr. 20, 1972, 2219940

Int. Cl. B41l *47/46*

U.S. Cl. 101—91 **8 Claims**

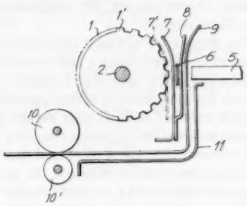


1. In a selectively printing rotary duplicator having a drive for rotating a printing roller, a combination comprising a rotary printing roller including holding means for holding on said printing roller a printing form having a plurality of circumferentially spaced printing sections; a counter roller cooperating with said printing roller, one of said rollers being movable to and from a printing position closely proximal to and defining with the other roller a printing line; operating means for effecting movement of said one roller to and from said printing position; adjustable selecting means associated with said operating means for moving said one roller to said printing position and maintaining it in the same for selected different portions of the time required for one revolution of said printing roller, so that the number of printing sections passing through said printing line is a function of the selected time portion, said selecting means comprising at least two coaxial cam disks having circumferential cam track portions operative for engaging said operating means and moving said one roller to said printing position; signalling means for providing signals indicative of the printing sections selected for printing; actuating means associated with said signalling means and said selecting means for actuating the former in response to printing selections made with the latter, said actuating means comprising a pair of rotatable cam plates adapted to each be turned synchronously with one of said cam disks, said cam plates having actuating portions, and a stationary unit comprising a plurality of electrical contacts connected with said signalling means and arranged circularly about said cam plates so as to be operated by engagement with respective ones of said actuating portions; and drive means for selectively effecting independent and joint movement of said cam disks about the common axis thereof, said drive means including first gears fixedly connected with the respective cam disks and each driving a second gear, and said second gears each serving to drive one of said cam plates in synchronism with a respective one of said cam disks.

3,874,285
PRINTER

Kozo Kodaira, and Kazuto Tamai, both of Matsumoto, Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo and Shinshu Seiki Kabushikik Kaisha, Nagoya, both of, Japan

Filed Apr. 13, 1973, Ser. No. 351,048
Claims priority, application Japan, Apr. 17, 1972, 47-38526
Int. Cl. B41j *7/06*
U.S. Cl. 101—93.28 **2 Claims**



1. A printer of the type having, in operable combination, a pattern-carrier for carrying a plurality of symbols on the surface thereof, at least one print hammer for printing at least one of said symbols according to a print command, an ink ribbon disposed between said at least one print hammer and said pattern-carrier, said ink ribbon being deformable in response to the strike of said at least one print hammer against it, and printer including a means for holding and protecting said ink ribbon comprising a first mask having an elastic body and a plurality of substantially axially aligned windows therein, said windows being alignable with a selected row of said plurality of symbols carried on the surface of said pattern-carrier, and a second mask having an elastic body and a plurality of substantially axially aligned windows therein, said windows provided in said second mask being also aligned with said windows provided in said first mask, each discrete window provided in said first mask being coaxial with a window respectively provided in said second mask, said first and second masks being disposed between said pattern-carrier and said at least one print hammer, said ink ribbon being movable between said first and second masks and the inking portion of said ink ribbon being aligned with said respective pluralities of windows provided in said first and second masks, said at least one print hammer having a strike path through a pair of coaxial windows provided respectively in said first and second masks.

3,874,286
PRINTING APPARATUS

Chuji Ishikawa, Kawasaki, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Aug. 28, 1973, Ser. No. 392,180
Claims priority, application Japan, Aug. 30, 1972, 47-86252
Int. Cl. B41j *7/36*
U.S. Cl. 101—93.18 **8 Claims**

1. A printing apparatus for cash registers and the like comprising:

a. a rotatable type wheel having a first serrated portion thereon;

b. a rotatable connection disc having a second serrated portion thereon cooperating with said first serrated portion to rotate said type wheel in response to rotation of said connection disc;

c. a rotatable main shaft having said connection disc loosely mounted thereon;

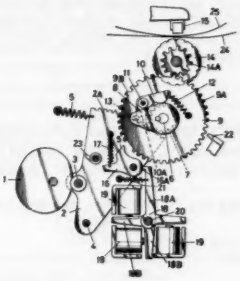
d. gear means secured to said main shaft for rotation therewith;

e. means for rotating said gear means in opposite directions about the axis of said main shaft;

f. an arm member secured at one end to said main shaft for rotation therewith and formed on its opposite end with a lock member;

g. a lever member pivotally supported on said connection disc and having:

1. catch means formed thereon for cooperatively engaging said lock member;



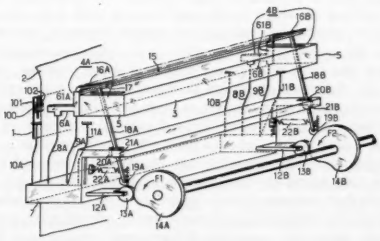
2. means connected between said lever member and said connection disc for urging said catch means into cooperative engagement with said lock member so as to rotate said connection disc with said main shaft through said arm member and for releasing said cooperative engagement upon the stopping of connection disc rotation; and

h. means for stopping said connection disc during rotation at a predetermined position corresponding to a desired position for said type wheel.

3,874,287
PRINTING MACHINES

Jacques Aldea, Danjoutin, France, assignor to Societe Honeywell Bull (Societe Anonyme), Paris, France

Filed June 5, 1973, Ser. No. 367,253
Int. Cl. B41j *9/42*
U.S. Cl. 101—93.48 **15 Claims**



1. A printing machine comprising a character support carrying a number of printing characters and a plurality of striking hammers between which is adapted to pass a printing medium, means for resiliently mounting said striking hammers for movement toward and away from said printing characters, means for deflecting said resilient mounting means for arming said striking hammers for movement toward said printing characters, means for selectively holding and releasing said armed striking hammers whereby upon the release thereof said striking hammers move toward said printing characters and rebound therefrom, means for damping said striking hammers during the rebound movement thereof in a direction away from said printing characters, said damping means being supported by a beam spanning said striking hammers, said damping means being defined by a plurality of tongues each

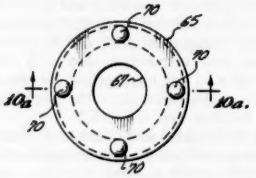
tongue being associated with one of said striking hammers, said arming means including a carriage carrying said resilient mounting means, said arming means further including means for moving said carriage toward said printing characters for deflecting said resilient mounting means whereby said striking hammers are armed, and means responsive to said last-mentioned movement of said carriage for moving said beam and the damping tongues carried thereby toward said striking hammers generally simultaneously with the movement of said carriage toward said printing characters thereby to position said tongues to intercept the striking hammers during the rebound movement thereof.

3,874,288

HIGH SPEED IMPACT PRINTER

Larry P. Ellefson, and M. Ray Dilling, both of Seattle, Wash., assignors to Interface Mechanisms, Inc., Mountlake Terrace, Wash.

Filed Oct. 3, 1973, Ser. No. 403,279
Int. Cl. B41j *1/24*
U.S. Cl. 101—110 **8 Claims**



1. An article useful in an impact printer for coupling rotational force generated by a drive member mounted to rotate about a central shaft to a print wheel mounted to rotate about said central shaft and movable therealong by means mounted on said central shaft for moving said print wheel axially of said central shaft in the direction of said drive member, comprising a ring-like, generally flat pad having upper and lower spaced surfaces and a peripheral edge surface therebetween, the lower surface of which is adapted to mate with a portion of said drive member so that the pad rotates therewith when so mated, the upper surface of which is presented in operation adjacent the print wheel such that said drive member, said pad, and said print wheel are positioned axially sequentially along said central shaft, the upper surface having one or more hump-like integral portions thereof extending therefrom to contact a first surface of said print wheel, the remainder of said upper surface remaining out of contact with said first surface, said hump-like portions being sufficiently compressible such that upon application of pressure on said print wheel axially of said central shaft in the direction of said drive member, said hump-like portions deform and engage said first surface to rotate said print wheel upon rotation of said drive member.

3,874,289

SCREEN PRINTING PRESS

Jean-Claude Valentin, Joinville-Le-Pont, France, assignor to Produ, AG, Basel, Switzerland

Filed Dec. 11, 1972, Ser. No. 314,043
Claims priority, application Germany, Dec. 10, 1971, 2161385
Int. Cl. B41f *17/18, 17/24, 17/28*
U.S. Cl. 101—123 **13 Claims**

1. A screen printing press with at least one printing station for printing onto objects which perform a rotational movement during the printing step comprising:

a reciprocable object carrier for retaining and rotatably supporting the object during printing;

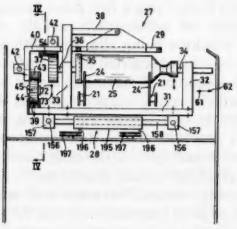
a reciprocable carrier for a printing screen disposed over the object carrier for contact with the object to be printed, the object being rotated in synchronism with the displacement of the printing screen about its longitudinal axis and in rolling engagement with the screen;

a reciprocable carrier for a doctor means disposed above said screen for movable contact with said screen, said doctor means being fixed to said object carrier;

first drive means coupled to said object carrier for reciprocating said object carrier, the reciprocating movement having a fixed stroke;

second drive means for reciprocating the screen, said second drive means comprising a first toothed rack mounted on said object carrier, a second toothed rack mounted on said carrier for said printing screen, parallel and adjacent to said first toothed rack, a gear meshing with said first and second toothed racks, and a coupling member having one end connected to the axis of said gear for controlling the reciprocating motion between the gear and the first and second toothed racks, so that the size of the stroke of the screen can be adjusted to the length of the image to be printed on the objects.

12. A screen printing press having at least one printing station for printing onto flat objects comprising:



a reciprocable object carrier for retaining and supporting the object during printing;

a reciprocable carrier for a printing screen disposed over the object carrier for contact with the object to be printed which is moved in synchronism with the screen during the printing step, said screen carrier being fixed to said object carrier;

a reciprocable carrier for a doctor means disposed above said screen for movable contact with said screen;

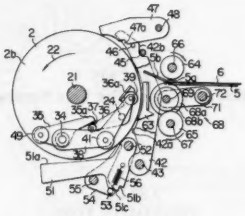
first drive means for reciprocating the object carrier, the reciprocating movement having a fixed stroke;

second drive means for reciprocating said doctor means carrier, said second means being adjustable for adjusting the length of the stroke of said doctor means to the length of the image to be printed onto the object, said second drive means for reciprocating said doctor means comprising a first toothed rack mounted on said object carrier, a second toothed rack mounted on said carrier for said doctor means adjacent and parallel to said first toothed rack, a gear meshing with said first and said second toothed racks, and a coupling member having one end connected to the axis of said gear for controlling the reciprocating motion between the gear and the first and second toothed racks, so that the size of the stroke of the screen can be adjusted to the length of the image to be printed on the objects.

3,874,290
MASTER PLATE FEED AND DISCHARGE DEVICE FOR DUPLICATING APPARATUS

Minoru Suzuki, Yokohama, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed June 8, 1973, Ser. No. 368,021
Claims priority, application Japan, June 13, 1972, 47-69760
Int. Cl. B41l *29/14, 31/00*
U.S. Cl. 101—132.5 **3 Claims**



1. A master plate feed and discharge device for duplicating apparatus, comprising

a. a master plate feed tray for holding a master plate;
b. a master feed roller for feeding a master plate to a master cylinder from said feed tray;
c. means provided on the master cylinder for automatically gripping a leading end portion of a master plate fed to the master cylinder;
d. a master discharge roller disposed below the master feed roller;
e. an actuation roller interposed between said master feed roller and said master discharge roller and adapted selectively to cooperate with the two rollers; and
f. means for moving the actuation roller to a position in which it cooperates with the master feed roller when a master feed operation is performed and to a position in which it cooperates with the master discharge roller when a master discharge operation is performed;
g. said actuation roller comprising a plurality of major diameter portions and minor diameter portions arranged alternately on the same axis, said major diameter portions being disposed for cooperation with the master feed roller and said minor diameter portions being disposed for cooperation with the master discharge roller.

3,874,291
CREDIT CARD IMPRINTING APPARATUS

Edward M. O'Reilly, New York; Alan Heftman, Brooklyn, and Lewis C. Hoff, New York, all of N.Y., assignors to Bartizan Corporation, New York, N.Y.

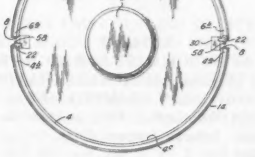
Continuation of Ser. Nos. 388,019, Aug. 13, 1973, abandoned, and Ser. No. 239,281, March 29, 1972, abandoned. This application Apr. 9, 1974, Ser. No. 459,405
Int. Cl. B41f *3/04*
U.S. Cl. 101—269 **5 Claims**

1. An apparatus for use with cards having embossed characters thereon and comprising means for imprinting the characters upon forms, said means including a base member having a pair of slotted sidewalls, an imprinting head, a shaft fitted within said imprinting head, a roller rotatably disposed about an intermediate length of said shaft, the imprinting head being mounted for longitudinal travel over said base member and including a housing having end segments extending downwardly and along said sidewalls to a level intermediate thereof, each of the segments having a bottom flange projecting inwardly for sliding engagement with the adjacent sidewall, said segments being formed with elongated openings freely supporting the shaft for vertical movement with respect to said base, spring means interacting with the shaft to resiliently urge said roller downwardly, said base member having an upper surface formed with a channel having a bottom formed with depressed surface portions adapted for removably holding said cards in a printing position, said channel including an end recess for accommodating said roller in a rest position, and an elongated indentation formed along the channel bottom and extending normal to said sidewalls, the indentation being located intermediate the end recess and the depressed portions for receiving a leading end portion of said forms.

3,874,292
PLATE CLAMP

Robert L. Parsley, Dallas, Tex., assignor to Dahlgren Manufacturing Company, Inc., Dallas, Tex.

Filed Sept. 17, 1973, Ser. No. 397,898
Int. Cl. B41f *27/12*
U.S. Cl. 101—415.1 **6 Claims**



1. Apparatus to secure a printing plate having apertures formed in flanges on leading and trailing edges thereof to a cylinder having a longitudinally extending gap formed therein comprising: spaced pegs secured adjacent a first edge of the gap formed in the cylinder; a shaft; connector pins on said shaft positionable in apertures in the flange on the trailing edge of the printing plate; means to rotatably secure the shaft adjacent the second edge of the gap formed in the cylinder; and resilient means secured between the shaft and the means to rotatably secure the shaft to the cylinder, said resilient means being adapted to urge the connector pins on the shaft into the gap formed in the cylinder.

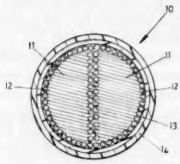
3,874,293
FUSES AND CORDS

Peter Charles Seligmann, Johannesburg, South Africa, assignor to AE & CI Limited, Johannesburg, South Africa

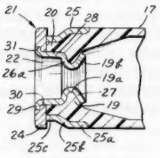
Filed May 10, 1973, Ser. No. 359,122
Claims priority, application South Africa, May 18, 1972, 72/003384
Int. Cl. C06c *5/00*
U.S. Cl. 102—27 R **8 Claims**

1. A plural core non-detonating incendiary fuse for use in initiating explosives, said fuse having at least two contacting parallel lengths of semi-fuse, the cross-section of the lengths of semi-fuse when added together forming a substantially

circular cross-section, each of said contacting parallel lengths of semi-fuse having a core of incendiary composition, said semi-fuses being enclosed within an outer casing thereby forming a plural core incendiary fuse of circular cross-section.



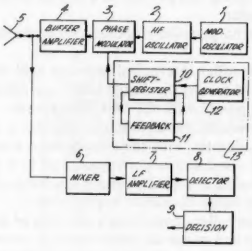
3,874,294
PLASTIC CARTRIDGE CASE FOR HIGH PRESSURE CENTER FIRE AMMUNITION HAVING MULTI-COMPONENT STAMPED METAL HEAD
H. Jackson Hale, Wilmington, Del., assignor to Remington Arms Company, Inc., Bridgeport, Conn.
Filed Jan. 2, 1973, Ser. No. 320,328
Int. Cl. F42b *5/30*
U.S. Cl. 102—44 **7 Claims**



1. A cartridge case for a high-powered center fire cartridge comprising a plastic casing with a rearward end, a transverse wall defining a flash hole, and a rearwardly extending skirt, a metallic tubular reinforcing sleeve positioned around the skirt, a metallic extraction rim having a central opening and positioned against the rearward end of the casing for holding the reinforcing sleeve against removal from the casing, and a metallic cup member having an outwardly directed peripheral flange at a rear end portion and a tubular extension at a forward end portion and being positioned within the skirt and the central opening of the extraction rim with the tubular extension extending through the flash hole and the peripheral flange holding the extraction rim against removal, the tubular extension being outwardly flared to abut the transverse wall in interlocking relationship.

3,874,295
Patent Not Issued For This Number

3,874,296
PROXIMITY FUSE
Rolf Hedemark, Fjellhamar, Norway, assignor to A/S Kongsberg Vapenfabrikk, Kongsberg and Forsvarets Forskingsinstitutt, Kjeller, both of, Norway
Filed Oct. 16, 1973, Ser. No. 406,923
Claims priority, application Norway, Oct. 16, 1972, 3705/72
Int. Cl. F42c *13/04*
U.S. Cl. 102—70.2 P **6 Claims**

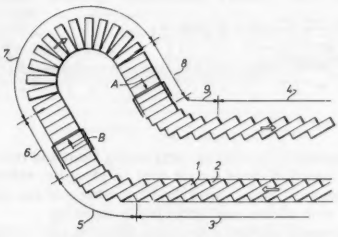


1. Proximity fuse comprising a distance measuring system based on reflection of a frequency modulated signal having a linearly increasing sweep frequency, characterized in that the frequency modulated signal is phase modulated 180° in step with a quasi-random code.

3,874,297
CONVEYORS
Kyozo Kondo, Mihara, and Takeyoshi Okimoto, Takehara, both of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 28, 1974, Ser. No. 455,807
Claims priority, application Japan, Mar. 30, 1973, 48-35613
Int. Cl. A65g *1/00*
U.S. Cl. 104—25 **3 Claims**

1. A variable speed conveyor which comprises a plurality of movable platforms, means to advance the platforms and means to guide the platforms around a circuit composed of a forward path, a revolving zone at one extremity of travel of the conveyor, a return path and a revolving zone at the other extremity of travel of the conveyor, wherein, in operation the platforms in each revolving zone revolve about an axis sub-

stantially perpendicular to the plane in which the platforms move whereby the platforms are available for conveying on both the forward and the return path and wherein there is provided in each revolving zone means to engage the outermost end of each platform and advance the platform through the revolving zone,



comprising a cable on which rollers are situated at equally spaced intervals and wherein the platforms are provided with slots which are engaged by the rollers in the revolving zone.

3,874,298

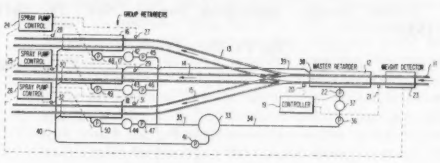
NOISE SUPPRESSION SYSTEM FOR CAR RETARDERS

Willis R. Smith, and Daniel E. Turner, both of Rochester, N.Y., assignors to General Signal Corporation, Rochester, N.Y.

Continuation-in-part of Ser. No. 302,701, Nov. 1, 1972. This application Feb. 1, 1974, Ser. No. 438,858

Int. Cl. B61b *1/00*

U.S. Cl. 104—26 A **4 Claims**



1. A method for suppression of noise in railway car retarders which comprises spraying an oil-in-water emulsion of a high viscosity soluble petroleum lubricating oil in a ratio of 30 : 1 to 50 : 1 water to oil, against the wheels of a railway car so that said emulsion is brought into the zone of interface contact between said wheels and the braking shoes on either side of said rail.

3,874,299

ELECTROMAGNETIC SWITCHING

Tony H. Silva, Van Nuys, and Arthur Schnitt, Los Angeles, both of Calif., assignors to The Aerospace Corporation, Los Angeles, Calif.

Continuation of Ser. No. 301,600, Oct. 27, 1972, abandoned. This application Oct. 29, 1973, Ser. No. 410,845

Int. Cl. E01b *25/06*

U.S. Cl. 104—130 **7 Claims**

1. A system for guiding vehicles through diverging branches of a switch in a vehicle guideway comprising:

a guideway having parallel sides leading to a switch entry and said sides diverging within the switch;

a frog switch exit branches with the diverging guideway sides;

a series of uniformly spaced opposing magnets along said parallel sides and constituting one part of a linear electric motor;

a series of uniformly spaced electromagnets on each of the guideway diverging sides and forming continuations in the switch of the magnet series on the parallel sides;

means to selectively energize one or the other of the series of electromagnets to simultaneously propel and guide a

vehicle through a selected one of the switch exit branches; and

means interacting between the vehicle and the guideway to constrain vehicle travel through a selected switch exit branches in the event of electromagnet failure.

3,874,300

SUSPENSION AND COUPLING DEVICE FOR THE MOVABLE MAGNETIC FIELD UNIT OF A LINEAR INDUCTION MOTOR

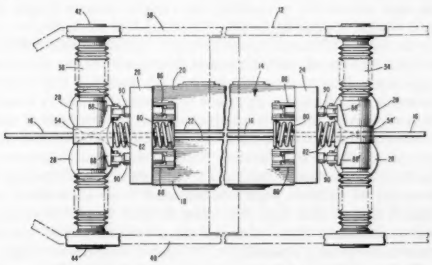
Jean-Pol Payen, Grenoble, France, assignor to Societe Dauphinoise Electrique, Grenoble, France

Filed Mar. 6, 1973, Ser. No. 338,519

Claims priority, application France, Mar. 15, 1972, 72.09749

Int. Cl. B61b *13/08*

U.S. Cl. 104—148 LM **10 Claims**



1. A suspension and coupling device connecting a movable linear induction motor magnetic field unit straddling an upstanding stationary armature rail to a vehicle moving along said armature rail, comprising:

a pair of substantially parallel shafts extending transversely of said vehicle and spaced in the longitudinal direction thereof adjacent the longitudinal end portions of said field unit, respectively;

linkage means suspending each of said end portions from the adjacent shaft, said linkage means being pivotally connected to said end portions and to said shafts to support the weight of said field unit and to permit longitudinal rocking movements of said field unit;

a pair of driving-force transmitting members projecting from said field unit adjacent said shafts, respectively, and

having each a drive portion horizontally aligned with the corresponding shaft; and

self-centering resilient transmission means connecting said drive portions resiliently to the corresponding shaft thereby to apply to said shafts substantial horizontal driving forces produced by said field unit and to permit to said field unit to execute said rocking movement against the action of said self-centering resilient transmission means.

3,874,301

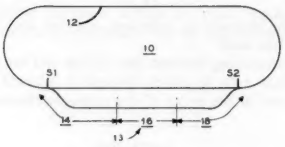
ELECTRICAL TRANSPORTATION SYSTEM

Mihai Almanestianu, 468 Park Ave. South, Upper Nyack, N.Y. 10016

Filed Feb. 16, 1973, Ser. No. 333,045

Int. Cl. B60m *5/00*

U.S. Cl. 104—152 **2 Claims**



1. A transportation system comprising: guiding means for guiding a vehicle along a path; an electrical conductor disposed along said guiding means; a vehicle, an induction motor on said vehicle for propelling the vehicle; pickup means on said vehicle for conductively connecting said induction motor to the region of the electrical conductor adjacent said vehicle; a first section of said electrical conductor being disposed adjacent a first portion of said guiding means, a first power source means for applying power of constant frequency to said first section of electrical conductor; a second section of said electrical conductor insulated from said first section and disposed adjacent a decelerating portion of said guiding means, said second section of said electrical conductor comprising a plurality of calinear segments insulated from each other, at least a first of said segments comprising at least two subsegments insulated from each other, a second power source means comprising a plurality of AC power supplies each operating at a different frequency, said power supplies being connected to successive segments such that the frequency of the AC power to such segments decreases from segment to segment in the direction of vehicle travel and means associated with the AC power supply connected to said first segment for transmitting a different amplitude of AC power to each of said subsegments wherein the subsegment first to be utilized by the vehicle receives a lower amplitude of AC power than the second subsegment so that the induction motor produces a progressively increasing braking torque; and a third section of electrical conductor disposed adjacent an accelerating portion of said guiding means and a third power source means for transmitting AC power to said third section of said electrical conductor which has a frequency increasing from a first frequency to a second frequency in a given time interval when said third power source means is energized.

3,874,302

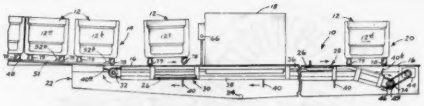
CONVEYOR SYSTEM FOR WHEELED CARTS

Bert Crosswhite, 6641 S.E. Johnson Creek Blvd., Portland, Oreg. 97206

Filed Apr. 1, 1974, Ser. No. 456,740

Int. Cl. B61b *13/00*

U.S. Cl. 104—172 B **10 Claims**



1. Apparatus for moving carts having front and rear wheels in one direction along a path over an elongate, substantially planar support surface with the front wheels of the cart leading the rear wheels, said apparatus comprising

an elongate conveyor disposed adjacent said surface and extending in the direction of said path, said conveyor including means for engaging and lifting the front end of such a cart comprising an elongate lug shiftable between a raised position projecting above said surface a distance sufficient to engage and lift the front end of a cart and raise its front wheels above said support surface and a lowered position spaced therebelow, and means for drawing the cart along said path with its rear wheels on said surface comprising drive means operatively connected to said lug for moving the same under power along said path when the lug is in its raised position.

3,874,303

A DEVICE FOR PULLING SKIERS

Kjelib Andren, Chalmersgatan 24, 411 35 Goteborg, Sweden

Filed Apr. 27, 1972, Ser. No. 248,078

Claims priority, application Sweden, Nov. 29, 1971, 15281/71

Int. Cl. B61b *11/00*

U.S. Cl. 104—173 **4 Claims**

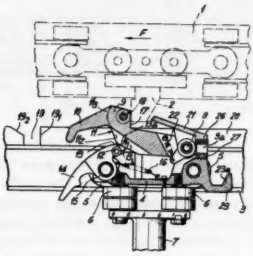
2. A ski-lift device comprising a driven hauling means of long extension and movable in its longitudinal direction, a plurality of inter spaced conveyor means connected to said hauling means at interspaced points therealong, said hauling means being constituted by an endless and broad band, rollers supporting said band for running near the ground, links connecting said conveyor means to said hauling means on the plane side of said hauling means facing away from said rollers, the part of said link extending out from said hauling means being flexible substantially in its entire length, a pulling band parallel to said hauling means band which is resilient at least along a portion of its extension, said pulling band having one of its ends being attached to said hauling band and the other end being attached to said link and guide means keeping said

pulling band substantially parallel to and lying against said hauling band.

3,874,304
CONVEYORS

Jean Robert, 7 Square Grange, Paris, France

Filed Oct. 9, 1970, Ser. No. 79,367
Claims priority, application France, Oct. 14, 1969, 69.35159
Int. Cl. B65g *17/42*
U.S. Cl. 104—172 S **12 Claims**



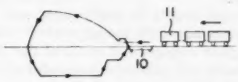
1. A conveyor apparatus, comprising:
a runway for trolleys;
releasable abutments disposed along the path of the conveyor;
a plurality of trolleys movable on said runway and from which loads may be hung; each trolley comprising a pivot arm having a drive hook rigidly attached thereto, a sensor comprising a rockable lever pivotally mounted on said trolley and biased by a tension spring, one end of which co-operates with a stop abutment and the other end of which co-operates with the pivot arm, that end of the rockable lever which co-operates with the pivot arm being in the shape of a rounded apex and having two flanks adapted to co-operate alternately with two facets of the pivot arm to lock the same in its two end positions, and the pviot arm having between said two facets a ramp with which the last-mentioned end of the rockable lever co-operates for enabling the tension spring to return the pivot arm from its retracted position to its operative position, said trolley also comprising sensor-controlled means for moving the pivot arm into two corresponding end positions when the sensor is in its end positions; and an endless chain extending substantially parallel to said runway, said chain having drive dogs thereon, which dogs are adapted to co-operate with the drive hook on each trolley so that when a trolley engages a stop abutment the drive dog is released from the trolley drive hook and the pivot arm of the trolley is locked in its retracted position.

3,874,305
ROBOT LOCOMOTIVE FOR CLASSIFYING ROLLING STOCKS

Katsutosh Sema, Omiya; Mitsuru Wakao, Iwatsuki; Yoshinori Kobayashi, Sagamihara, and Koichi Hara, Tokyo, all of Japan, assignors to Japanese National Railways and Kayabakogyo Kabushikikaisha, Tokyo, Japan

Filed Oct. 24, 1973, Ser. No. 409,140
Claims priority, application Japan, Dec. 29, 1972, 48-3787
Int. Cl. B61c *1/00, 17/00*
U.S. Cl. 105—26 R **7 Claims**

1. A hydraulically operated robot locomotive for pushing rolling stocks comprising a main frame supported on wheels so as to travel along a guide track; a power source mounted upon said main frame and comprising a hydraulic pump, means for driving said hydraulic pump, and a reservoir for working hydraulic liquid; a traction system comprising a plurality of hydraulic motors which are driven by hydraulic liquid under pressure supplied from said power source; a hydraulic control system including hydraulic control valves for controlling said power source and said traction system, an electronic control system for controlling said hydraulic control valves in

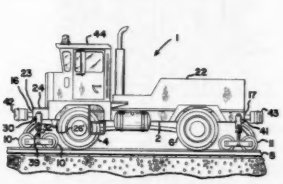


said hydraulic control system in response to control signals applied from the exterior of said robot locomotive; a hydraulic brake system for applying mechanical brake to said wheels of said main frame; and a hydraulic rolling stock pusher assembly adapted to releasably couple said robot locomotive to a rolling stock, whereby said robot locomotive may push the rolling stock.

3,874,306
RAIL DRAFT VEHICLE

Harold L. Coons, Gladstone, and Jack L. Highfill, Grandview, both of Mo., assignors to ISCO Manufacturing Company, Inc., Kansas City, Mo.

Filed Feb. 21, 1974, Ser. No. 444,265
Int. Cl. B61c *17/00*
U.S. Cl. 105—26 R **7 Claims**



3. A draft vehicle for moving freight cars on rails and a trailer on highways, said draft vehicle comprising:
a. a mobile draft vehicle and a frame therefor having front and rear ends;
b. front and rear axles adjacent said front and rear ends respectively, said frame being mounted on said front axle by resilient suspension means and mounted on said rear axle by substantially rigid suspension means;
c. pneumatic rubber tired traction wheels on the front and rear axles with a lateral spacing corresponding to the spacing of rails on which the draft vehicle is to be operated for centering of each wheel on a respective rail;
d. power means mounted on said vehicle and selectively connectable to said rear wheels to drive said rear wheels and to said front and rear wheels to drive said front and rear wheels to propel the vehicle selectively forwardly and rearwardly;
e. a platform on the frame of said vehicle and having opposite side edges and a mass substantially evenly distributed between said front and rear traction wheels, said platform and frame and power means being arranged for a weight distribution that is substantially equal on all traction wheels for maximum traction for moving rail cars and trailers on respective paths;
f. front and rear flanged guide wheels mounted on said frame and positioned adjacent said front and rear traction wheels respectively for engaging the rails to guide said draft vehicle when said front and rear traction wheels are in traction engagement with the rails;

g. means mounted on said frame and operatively connected to said front and rear guide wheels for selectively moving same into and out of engagement with the rails and maintaining guiding engagement when said guide wheels are engaged with the rails;

h. means mounted on said frame adjacent each of the front and rear ends of said frame for coupling and connecting to an end rail car of a train of rail cars to be moved by said draft vehicle;

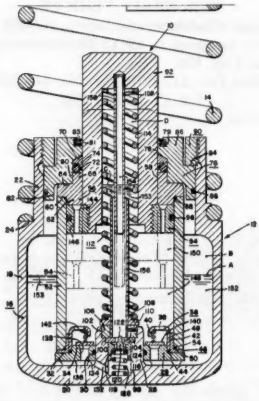
i. said front and rear a..le suspensions and guide wheel moving means accommodating uneven rails and maintaining traction engagement of all of the front and rear traction wheels and guiding engagement of front and rear guide wheels with said rails.

3,874,307

HYDRAULIC BOLSTER DAMPENING DEVICE

Stuart A. Schwam, Broomall, Pa., assignor to Railroad Dynamics Inc., Newtown Square, Pa.

Filed Oct. 26, 1973, Ser. No. 410,191
Int. Cl. B61f *5/06, 5/12;* **B61h** *11/00*
U.S. Cl. 105—197 DH **16 Claims**



1. In a motion damping device, the combination comprising

A. a casing,

B. a member within said casing defining a working chamber and conjointly with said casing defining a reservoir extending about said member,

C. a piston including

1. a head operating in said working chamber and dividing the same into variable volume compression and compensating chambers, and

2. a rod extending upwardly from said head and through the top of said casing,

D. spring means yieldably biasing said piston head upwardly to extend said piston rod,

E. hydraulic fluid normally filling said compression and compensating chambers and partially filling said reservoir,

F. means valved for passage of said fluid from said compression chamber to said reservoir when said piston is retracted against the influence of said spring means and for passage of said fluid from said reservoir to said compression chamber when said piston is extended by said spring means,

G. purging means in said compression chamber operable in response to retraction of said piston for expelling air from said compression chamber and forcing it into said reservoir, and

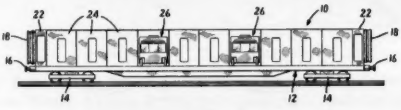
H. a compression coil spring seated upon said casing and extending upwardly therefrom a substantial distance above the upper extremity of said piston rod.

3,874,308

TRANSPORT APPARATUS

Michele Michahelles, 115 E. 90th St., New York, N.Y. 10028

Filed Jan. 15, 1974, Ser. No. 433,474
Int. Cl. B61d *3/02*
U.S. Cl. 105—368 R **10 Claims**



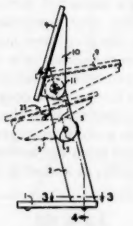
1. Transport apparatus comprising a mobile carrier vehicle having an elongated platform and an enclosure laterally adjacent and extending above the platform, the enclosure including longitudinally spaced-apart doorways opening onto the platform, the bottom edges of the doorways being substantially above the platform and at least two self-propelled vehicles positioned on the platform for transport on the carrier vehicle, each self-propelled vehicle having a body defining an enclosed compartment, and having a medial passage in the compartment extending generally parallel to the direction the vehicle moves when self-propelled along a straight path and having an entry-exit doorway generally axially aligned with the passage, and means releasably securing each self-propelled vehicle on the platform of the carrier vehicle in a position in which the doorway of each self-propelled vehicle communicates with a doorway of the enclosure of the carrier vehicle.

3,874,309

ARTICULATED COLUMN DRAFTING TABLE

Gary Cowley, 2331 Main St., Vancouver, British Columbia, Canada

Filed May 1, 1974, Ser. No. 465,835
Int. Cl. A47f *5/12*
U.S. Cl. 108—2 **8 Claims**



1. A drafting table having a forwardly inclined articulated column rising from the apex of a horizontal V-shaped base with the spread of its arms to the front and a drawing board tiltingly mounted on the top end of the column's upper limb characterized by individual and independent counterbalance means for the upper limb of the articulated column and the tiltable drawing board on the top end thereof respectively;

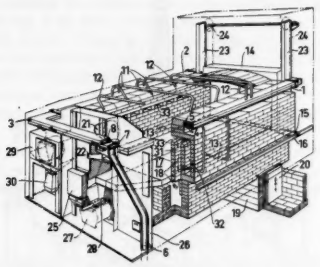
means to limit the arc through which the upper limb of the articulated column may hinge; separate means to limit the arc through which said drawing board may tilt; and

a common locking device for releasably holding the hingeable limb and the tiltable drawing board in any desired position within their respective permitted turning arcs.

3,874,310
CREMATORY OVEN

Kjell Falling, Alvsjo, Sweden, assignor to Tabo Industriugnar AB, Stockholm, Sweden

Filed July 10, 1973, Ser. No. 378,023
Int. Cl. F23g *1/00*
U.S. Cl. 110—3 **4 Claims**



1. A crematory oven consisting essentially of a brickwork retort structure held together and surrounded by a ferrous metal structure

said ferrous metal structure comprising generally vertical first and second end walls formed of ferrous metal sections, said first end wall having a charging door and said second end wall having an operation door;

a drum system; and

said brickwork retort structure, extending between said first and second end walls, comprising longitudinal side walls and a roof member, said brickwork structure together with said first and second end walls and a bottom plate providing an incineration space to which space said charging and operation doors give access; and

burner means within said incineration space said burner means being in communication with a source of fluid fuel; said drum system, formed of ferrous metal, extending along both side walls and one of said end walls, and having branch ducts extending into the incineration space.

3,874,311
DRAPERY SEWING APPARATUS

Donald K. Kenney, 17739 La Rosa, Fountain Valley, Calif. 92708

Continuation-in-part of Ser. No. 124,835, March 16, 1971, abandoned. This application Nov. 19, 1973, Ser. No. 416,934
Int. Cl. D05b *3/04*
U.S. Cl. 112—121.14 **12 Claims**

1. A drapery sewing machine apparatus comprising:

a work table adapted to receive a length of drapery fabric in longitudinally extended flat relation;

clamping means disposed at and extending along one longitudinal side of said table for clamping one edge of the drapery fabric to hold it in parallel relation to the other side of said table;

traveling sewing means at the other longitudinal side of said table and including a stitcher head for sewing a strip of material to the adjacent edge of said drapery fabric;

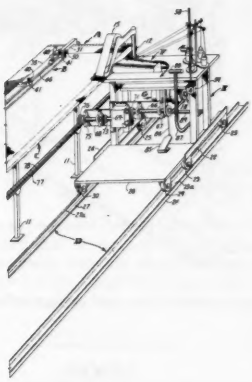
guide means including rail means adjacent and parallel to an edge of said other longitudinal side of said table;

motor means carried by said traveling sewing means;

first drive means to move said sewing means along said guide means, said first drive means including a drive shaft having a rotary drive member secured to one end for drivingly engaging a cooperative stationary drive member extending longitudinally of said guide means, a support for said drive shaft, means pivotally mounting said support on said traveling sewing means to allow movement of said rotary drive member from a normal position at which it engages said stationary drive member to a release position at which it is disengaged from said stationary drive member, and means for pivoting said support from said normal position to said release position;

second drive means for driving said stitcher head at a selected stitching rate;

a common drive connection between said motor means and said first and second drive means to simultaneously move said sewing means along said guide means and operate said stitcher head;



control means including a manually operable clutch means connecting said motor means to said common drive connection, said control means further including means for pivoting said support for said drive shaft to said release position when said clutch has disconnected said motor means from said common drive connection; and

an infinitely variable change speed transmission for one of said drive means, and means for varying said transmission for adjusting the relationship between the stitching rate of said stitcher head and the rate of movement of said sewing means along said guide means.

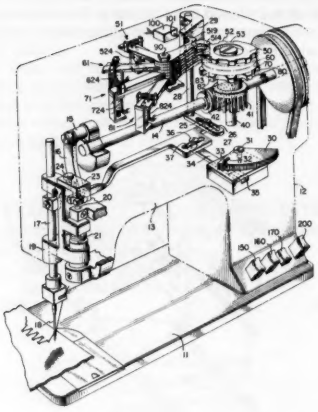
3,874,312
ELECTRIC CAM SELECTOR MECHANISM FOR SEWING MACHINES

Albert N. Cook, Madison, and Alfred R. Suchsland, Morris Plains, both of N.J., assignors to The Singer Company, New York, N.Y.

Filed Jan. 23, 1974, Ser. No. 436,018
Int. Cl. D05b *3/02*
U.S. Cl. 112—158 C **9 Claims**

1. In a sewing machine having stitch forming instrumentalities, mechanism in said sewing machine responsive to pattern information and effective to regulate the operation of at least one of said sewing machine stitch forming instrumentalities in the production of a pattern of stitches, a plurality of individual pattern information carying means associated with said sewing machine and each capable of cooperating with said mechanism to produce a predetermined stitch pattern, pattern sensing means associated with each said pattern information carrying means, electric motor means associated with each pattern sensing means and its associated pattern information carrying means for initiating relative movement between said pattern sensing means and said pattern information carrying means such that pattern information is transmitted to said mechanism, and a plurality of manually operable electric switch

means connected to said electric motor means with each said electric switch means being exclusively operable for selecting



an individual pattern from said pattern information carrying means.

3,874,313

SAILING RIG FOR SAILING BOATS

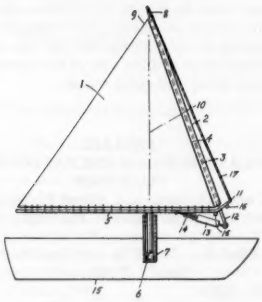
Rudolf Doepner, 106, Sternstrasse, Hamberg 6, Germany

Filed July 2, 1974, Ser. No. 485,171

Claims priority, application Germany, July 7, 1973, 2334621

Int. Cl. B63h *9/08*

U.S. Cl. 114—39 **5 Claims**



1. A sailing rig for sailing boats comprising a substantially horizontal main boom, a sail combined from a foresail and a main sail to form a single triangular sail and a sloping mast provided at the leading edge of said combined sail and connected thereto independently of the hull of the boat, the substantially horizontal main boom being rotatably mounted to swing about a vertical axis in a socket in the boat hull and the forward end of the main boom terminating in a fork-shaped swing joint embracing the bottom end of the mast which extends through the fork-shaped swing joint downwards to below the sweep of the main boom, where its free end is connected by block and tackle and a spring to the fore part of the main boom.

3,874,314

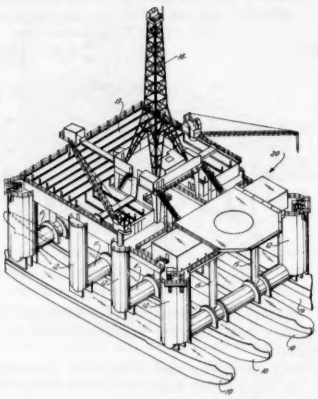
METHOD OF CONSTRUCTING SUBMERSIBLE STRUCTURES UTILIZING SUBMARINE HULLS

John P. Sanders, 5702 Winsome, Houston, Tex. 77027

Filed June 29, 1973, Ser. No. 375,018

Int. Cl. B63b *35/44*

U.S. Cl. 114—.5 D **6 Claims**



1. A method for constructing a submersible structure, such as for example a submersible offshore drilling rig, having support legs and bottom pontoons comprising the following steps:

a. securing a set of standard surplus submarines which theretofore had utility as separate, self-contained marine vessels;

b. stripping the submarine hulls above their top deck of major external projections such as for example the conning tower and working implements; and

c. fixedly attaching the support legs of the submersible structure to the upper surface of said submarine hulls and utilizing said submarine hulls as the pontoons for the submersible structure.

3,874,315

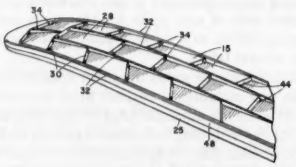
SURFACE TREATMENT FOR WATER BORNE VEHICLES

Edward Morris Wright, 986 Fifth Ave. Apt. 22, Chula Vista, Calif. 92011

Continuation-in-part of Ser. No. 156,710, June 25, 1971, abandoned. This application Sept. 7, 1973, Ser. No. 395,043

Int. Cl. B63b *1/38*

U.S. Cl. 114—67 A **7 Claims**



1. A surface treatment for water borne vehicles having a hull structure with substantial water wetted surface area and wherein the improvement comprises:

a surface treatment applied to said hull structure over substantially all of the water wetted surfaces of said vehicle, said surface treatment comprising a plurality of air lubrication cells, there being a plurality of said cells across the beam wise width of said water wetted surface, and a

plurality of said cells along the length wise dimension of said vehicle,

said cells having a step portion extending substantially normal to said hull structure contour, a ramp surface extending from the innermost portion of one step, and angling away from said hull structure contour, said ramp surface being connected to the outermost extent of the adjacent step, and longitudinal channels extending lengthwise over substantially the entire water wetted surface of said vehicle along both sides of said cells,

said step portion being penetrated by an air hole,

said surface treatment being supported at least in part by contact between said hull structure and the innermost portions of said steps,

a plurality of said air lubrication cells are above the nominal water line for said water borne vehicle,

whereby at least a portion of said air drawn through said air holes in said air lubrication cells below the nominal water line is supplied by cells above the nominal water line.

3,874,316

CROSS JET RUDDER FOR WATERCRAFT

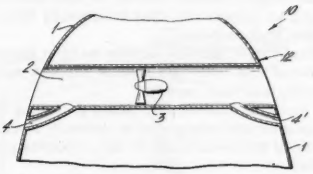
Otto Lorenz, Lubeck, Germany, assignor to Orenstein & Koppel AG, Lubeck, Germany

Filed Aug. 6, 1973, Ser. No. 386,162

Claims priority, application Germany, Aug. 19, 1972, 2240842

Int. Cl. B63h *25/46*

U.S. Cl. 114—151 **5 Claims**



1. A cross jet rudder for watercraft, comprising a watercraft hull having a steering water channel defined in said hull extending transversely from side to side below the water line thereof, a water pressure equalizing channel extending entirely below the water line and from the outer surface of said hull on one side of the watercraft directly adjacent the steering water channel and directly into the steering water channel at a spaced location from at least one end thereof and being normally filled with sea water, and propulsion means in said steering water channel for moving water through said steering water channel.

3,874,317

COOLING WATER INTAKE APPARATUS FOR MARINE VESSELS

Isao Hikita, 786-2 Nishioizumi, Nerimaku, Tokyo, Japan

Filed Aug. 20, 1973, Ser. No. 389,990

Claims priority, application Japan, Dec. 15, 1972, 47-125905; May 17, 1973, 48-55015

Int. Cl. B63b *13/00*

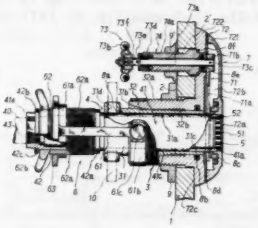
U.S. Cl. 114—198 **12 Claims**

1. A cooling water intake apparatus for use with a marine vessel comprising

a. a tubular block which is secured in a through hole provided in the hull of said vessel wherein said tubular block communicates between the inboard and outboard sides of said hull, said tubular block having an intake port on the outboard side of said hull,

b. an intake pipe removably inserted into said tubular block,

c. a strainer attached to said intake pipe, and



d. a closing means mounted on said tubular block for opening and closing said intake port of the tubular block, wherein said closing means is adapted to open and close said intake port of the tublar block beyond the outboard end of said intake pipe.

3,874,318

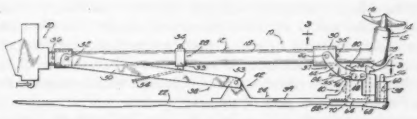
MOUNTING ASSEMBLY FOR SMALL OUTBOARD MOTORS

John A. Langley, Zion, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Mar. 15, 1974, Ser. No. 451,583

Int. Cl. B63h *21/26*

U.S. Cl. 115—17 **13 Claims**



1. An outboard motor comprising a propulsion unit including an upper unit, a lower unit carrying a propeller, and means connecting said upper and lower units including an elongated member, a support member fixedly connected to said elongated member at a location intermediate said upper and lower units, a bracket adapted to be mounted on a boat hull, first sleeve means slidably mounted on said elongated member between said support member and said lower unit for relative movement between said elongated member and said first sleeve means, said first sleeve means engaging said support member when said propulsion unit is in an operating position, second sleeve means mounted on said elongated member between said support member and said upper unit for relative movement between said elongated member and said second sleeve means, and first and second link means respectively pivotally connected to said first and second sleeve means and pivotally connected to said bracket for pivotal movement of said link means relative to said bracket to afford movement of said propulsion unit between an operating position and a storage position.

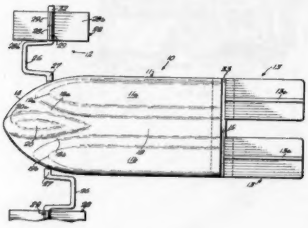
3,874,319
MANUALLY PROPELLED WATER CRAFT

Gerald Martin, 7525 E. Treasure Dr., Miami Beach, 33141; James A. Baccus, 595 N.W. 91st Rd., and Marvin Gurman, 20221 N.E. 25th Ave., both of North Miami, 33161, all of Fla.

Continuation-in-part of Ser. No. 170,481, Aug. 10, 1971, Pat. No. 3,779,202. This application Apr. 30, 1973, Ser. No. 355,309

Int. Cl. B63h *16/00*

U.S. Cl. 115—23 **6 Claims**



1. A manually propelled water craft, comprising, in combination, an elongated, buoyant support member, manually rotatable paddle wheel mechanism at the front of said support member, a pair of buoyant, laterally-spaced flap members extending rearwardly of the rear end of said support member, and hinge means interjoining the foreward ends of said flap members with said support member and providing for swinging movement thereof with respect to said support member independently about a transverse axis, the underside of said buoyant support member being formed along its length with a deep, central channel opening into said rear end of said support member, said channel, short of said front end of said support member being bifurcated to provide relatively divergent, symmetrically-arranged front channel portions in the underside of said support member, said symmetrically-arranged front channel portions being arcuate in shape and having substantially the same depth as that of said central channel, said front end of said support member being symmetrically rounded and the foreward ends of said front channel portions being arcuately widened at their zones of opening into said front end of said support member to define, with said central channel, a streamlined central support member portion, said manually rotatable paddle wheel mechanism comprising, at each side of said support member, a pair of half paddle wheel members, each half paddle wheel member further comprising a pair of opposed paddle wheel vanes integrally formed with an axially extending hub portion having a length of approximately one-half the width of said paddle wheel vanes, whereby each pair of half paddle wheel members can be assembled by moving the inner ends of their hub portions into coaxially-aligned, abutting engagement with the associated paddle wheel vanes angularly mutually spaced by 90 circular degrees, means journalling said paddle wheel mechanism half pairs for rotation in unison about a common axis extending transversely of said support member, said paddle wheel mechanism further comprising, at each side of said support member, a crank handle portion eccentrically offset with respect to said common axis, said crank handle portions being eccectrically offset in diametrically opposite directions, said paddle wheel members journalling means comprising a transversely-extending recess formed in the upper surface of said buoyant support member, an axle rod seated within said recess and extending outwardly of each side of said support member, said paddle wheel half members comprising means for their attachment to the outwardly projecting ends, respectively, of said crank handle portion, and means for removably constraining said axle to rotational movement in said recess, said attachment means for said paddle wheel half members comprising aligned, axially extending through openings in the hub portions of each of said pairs of paddle wheel half members, said through openings being rhombic in cross-sectional shape, said crank handle portion being formed with outer end portions coaxial with said axle rod and of complementary rhombic cross-sectional shape to fit snuggly within the through openings of one of said pairs of half paddle wheel members to rotatively interlock said half paddle wheel member pairs with their respective crank handle portions.

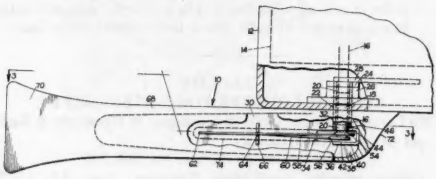
3,874,320
BOAT PROPULSION APPARATUS

Wilburn W. Wood, 2714 N.E. 119th St., Vancouver, Wash. 98964

Filed Nov. 16, 1973, Ser. No. 416,635

Int. Cl. B63h *1/36*

U.S. Cl. 115—28 R **2 Claims**



1. Boat propulsion apparatus comprising

a. a flexible body member having generally the shape of a fish with a thickened forward portion and a thinning rearward portion terminating in a tail,

b. tubular support means secured to said body member arranged to support the latter horizontally from its forward end under a boat,

c. a vertically rigid, laterally flexible member integrated at its forward end with said tubular support means and supporting said body member,

d. shaft means in said support means projecting into said body member and arranged to be driven by a boat motor,

e. a pair of horizontal cams on the projecting portion of said shaft,

f. said cams being eccentrically arranged on said shaft 180° around from each other,

g. cam followers engageable with said cams,

h. and a pair of lever means connected at one of their ends to respective ones of said cam followers and at their other ends of said flexible member at a rearward point,

i. said levers upon rotation of said shaft being operated by said cams and cam followers to produce an undulating motion of the rearward portion of the body member laterally similar to the swimming action of a fish to provide a forward propelling force.

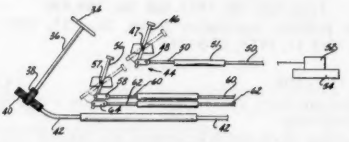
3,874,321
BOAT STEERING AND REVERSING SYSTEM

Joseph E. Smith, Birmingham, Mich., assignor to Wolverine-Pentronix, Inc., Lincoln Park, Mich.

Filed May 1, 1972, Ser. No. 249,168

Int. Cl. B63h *5/12*

U.S. Cl. 115—35 **8 Claims**



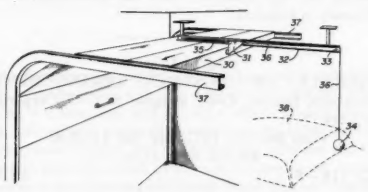
1. In a boat having a propulsion unit mounted on it rotatable about an upstanding axis, a steering means, a steering cable connected between said steering means and said propulsion

unit for rotating it for normal steering, a reversing cable operatively connected to said propulsion unit for rapidly turning it through substantially a half circle turn to provide changeover between forward and reverse boat operation, said propulsion unit including a steering gear fixed thereto, a control sector gear having its teeth in mesh with the teeth of said steering gear for selectively rotating it, said control gear having a first pivotable mounting means proximate its toothed portion and a second pivotable mounting means spaced from its toothed portion, said reversing cable coupled to said sector gear proximate said first mounting means for rotating said sector gear about said second mounting means to provide for the rapid turning of the propulsion unit, said steering cable coupled to said sector gear proximate said second mounting means for providing normal rotation of said control gear about said first mounting means for normal steering, wherein an internal combustion engine is operatively connected to said propulsion unit for providing drive thereto and a throttle means is operatively connected to said engine for providing its idling operation during the rapid turning of said propulsion unit.

3,874,322
VEHICLE POSITION INDICATOR

William Alvin Brauer, 28W384 Gary's Mill Rd., Winfield, Ill. 60190

Division of Ser. No. 293,416, Sept. 29, 1972, Pat. No. 3,817,203. This application Feb. 15, 1974, Ser. No. 442,927
Int. Cl. B60q *9/00*
U.S. Cl. 116—28 R **5 Claims**



1. In combination with a garage structure having an entry at one end thereof, a garage door having a closed position for closing off said entry way and an open position allowing access to said garage structure, a parking area enclosed by said garage structure and having defined boundaries, said structure being extended over said parking area;

means for defining a path of travel of said door between said open and said closed position;

a guide rail positioned parallel to a portion of said defined path;

a slide mounted in sliding contact on said guide rail and intersecting the path of travel of said door, said slide being moved along said guide rail in the direction of travel of said door when said door travels toward its open position;

a spring mechanism connected to said slide urging said slide in the direction of travel of said door when said door travels toward its closed position;

indicator means;

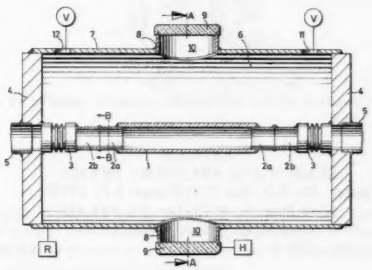
flexible cord means connected to said slide and said indicator means; and

a cord guide connected to said structure over said parking said flexible cord means being supported by said cord guide and said indicator means being suspended over said area by said flexible cord means, whereby travel of said slide in the direction of travel of said door is translated into travel of said indicator means in the vertical direction.

3,874,323
GAUGE FOR LIQUID, LOW-COOLED PRESSURE GASES

Hans Rottig, Kaarst, Germany, assignor to Messer Griesheim GmbH, Frankfurt/Main, Germany

Filed Feb. 15, 1974, Ser. No. 442,805
Claims priority, application Germany, Mar. 9, 1973, 7308975
Int. Cl. G01f *15/04, 15/06*
U.S. Cl. 116—117 R **8 Claims**



1. A gauge for observing low-boiling liquefied gases, characterized in a transparent tube through which the liquefied gas flows, a vacuum-tight chamber disposed completely around said tube with respect to the direction of flow of liquefied gas therein, two sight windows in the wall of said chamber for observing the liquefied gas in said tube, said sight windows being disposed opposite to and in line with each other at the level of said tube therebetween, a set of connecting members joining each end of said tube with a respective end wall of said chamber, said tube and connecting means being disposed entirely within said chamber, said tube being made of a glass material, each set of said connecting members comprising a transition means, which comprises a glass pipe, and compensating means for equalizing any longitudinal changes in said tube due to the liquefied gas flowing therethrough, each compensating means being a metal cylinder connected at one end to its said transition means and at the other end to one of said end walls of said chamber, each said pipe being connected at one end to its said metal cylinder and at its other end to said tube, and said tube being in flow communication with said glass pipes and said metal cylinders whereby the liquefied gas may flow through said chamber by flowing through one of said metal cylinders into its glass pipe and through said tube and then exiting through the other of said glass pipes and then out the other of said metal cylinders.

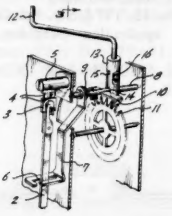
3,874,324
PENDULUM AND ESCAPEMENT ANCHOR RELATIONSHIP INDICATOR AND SETTER

Dale Nofziger, Lynnwood, Wash., assignor to Ansonia Clock Company, Inc., Lynnwood, Wash.

Continuation-in-part of Ser. No. 250,783, May 5, 1972,. This application Feb. 6, 1974, Ser. No. 439,877
Int. Cl. G09f *9/00*
U.S. Cl. 116—124 R **8 Claims**

1. Clock escapement mechanism comprising a frame, an escape wheel, shaft means mounting said escape wheel and journaled in said frame for rotation about an axis fixed relative to said frame, anchor means including an anchor and an anchor shaft carrying said anchor and journaled in said frame for rotation about an axis stationary with respect to said frame and fixed relative to said escape wheel axis, a pendulum connector frictionally mounted on said anchor shaft and angularly adjustable relative to said shaft, an indicator arm projecting

from and fixedly secured to said anchor shaft, and index means cooperating with said indicator arm for indicating the



angular position of said pendulum connector relative to said anchor shaft.

3,874,325

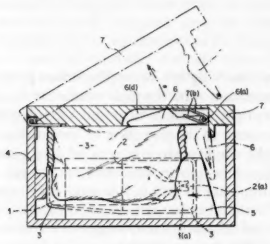
SEARCH AND RECOVERY DEVICE

John Cocker, III, P.O. Box 297, Clover, S.C. 29710

Filed Dec. 13, 1973, Ser. No. 424,451

Int. Cl. G09f 9/00; B64b 1/62

U.S. Cl. 116—124 B **6 Claims**



1. In a search and recovery position indicating device, the combination comprising a container in which is positioned a sealed and deflated balloon, a pressure cartridge enveloped by and contained within said deflated balloon within said container and containing under pressure a gas which is normally lighter than air, said cartridge having a gas-release means, shiftable actuator means also enveloped by and located within said deflated balloon and arranged in a position adjacent to said cartridge which, when moved, actuates said gas-release means, and blunt means also within said container but outside said balloon arranged to be shifted within said container to apply force through said balloon to said actuator means, and forcing means movable in said container to shift said blunt means, whereby the actuator means actuates the gas-release means, causing release of said gas within said balloon, with attendant release of said balloon by said container, the type and amount of gas contained in the cartridge being sufficient to lift the balloon by buoyancy in air even with the cartridge and the actuator means carried in the balloon.

3,874,326

SURFACE RELEASE DYE MARKER

George O. Pickens, 3635 Voltaire St., San Diego, Calif. 92106

Filed Feb. 25, 1974, Ser. No. 446,034

Int. Cl. G08b 1/00

U.S. Cl. 116—124 B **10 Claims**

1. An ascent-actuated dye marker for locating the surface position of an object released beneath the sea comprising:

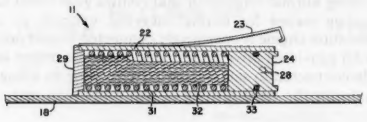
a body member having a closed end and a cylindrical cavity communicating with one end thereof;

cylindrical plug means slidably received within the cylindrical cavity for effecting a watertight seal with said cylinder wall to thereby form a sealed compartment within said body member;

dye material contained within and partially filling said cavity;

resilient means located within said cylindrical cavity positioned to engage said plug means for urging said plug means out of said cylindrical cavity;

clip means attached at one end to the outer surface of said body means said clip means being made of resilient material and formed to have a relaxed position in which the other end of said clip means extends away from said body member, said other end carrying a plug engaging portion for providing a releasable retention of said plug within the cylindrical cavity of said body member when in a tensioned position alongside said body member; and



clip engaging means on the outer end of said plug means for engaging the other end of said clip means when the plug is at the outer end of the cylindrical cavity and the clip means is tensioned for releasing the plug means after it moves a predetermined distance within the cylindrical cavity, whereby the plug is held in place upon submergence until water pressure overcomes the ejective urging of said resilient means forcing said plug within said cylindrical cavity such that said clip assumes its relaxed position permitting said resilient means to expel the plug to release the dye material when the submergence water pressure is reduced.

3,874,327

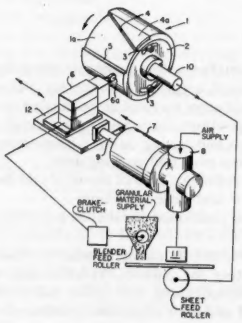
VARIABLE CAM ADJUSTMENT ARRANGEMENT

Irvin Furman, Denver, Colo., assignor to GAF Corporation, New York, N.Y.

Filed Dec. 22, 1972, Ser. No. 317,530

Int. Cl. B05c 11/10

U.S. Cl. 118—8 **3 Claims**



1. A control device for use in conjunction with an asphalt shingle manufacturing device of the type having at least one power driven feed roller for advancing asphalt substrate material, a blender feed roller for depositing granular material on the moving asphalt substrate, and an electric brake clutch for controlling the operation of the blender feed roller, comprising, in combination, a cam operatively connected for rotational movement to the power driven feed roller and having a cam surface which varies in shape across the face thereof; a switch electrically connected to the brake clutch slidably disposed in close juxtaposition to said cam and having an actuating arm in sliding operative contact with the cam surface to periodically energize and de-energize said brake clutch

in response to the rotational movement of said cam; pneumatic means having an extendible stem in operative engagement with said switch to move the switch along the cam surface in a direction parallel to the axis of rotation of said cam; and electro-pneumatic transducer means operatively connected to the pneumatic means and responsive to the speed of the asphalt feed roller, adapted to emit an output signal proportional in magnitude to such speed to actuate said pneumatic means to cause the stem thereof to move said switch along the cam surface a distance corresponding to the magnitude of the output signal; said cam surface being shaped such that the duration of each switch actuation increases as the speed of the asphalt feed roller increases.

3,874,328

DEVELOPING DEVICE FOR ELECTROPHOTOGRAPHY

Kenji Isonaka, Tokorozawa; Saburo Hokari, Kawasaki; Tatsuya Watanabe, Yokohama, and Masamichi Furukawa, Kawasaki, all of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed May 21, 1973, Ser. No. 362,253
Claims priority, application Japan, May 23, 1972, 47-51010
Int. Cl. B05c *1/02*
U.S. Cl. 118—116 **7 Claims**

1. A developing device for developing an electrostatic latent image formed on one side of a card material having a leading end and a traling end and having a length comparable to its width, said device comprising a developing roller having two axially spaced flanges, the axial distance between the flanges being less than the width of the card material but more than the width of the electrostatic latent image thereon, the diameter of each flange being greater than the diameter of the developing roller by a selected amount, means for rotating the developing roller, means for applying developing liquid to the developing roller, and means for moving the card material along a path tangential to the circumference of the flanges of the developing roller, with the image bearing side of the card material facing the developing roller and with the latent image thereof disposed intermediate the flanges of the developing roller, said moving means automatically moving the card material from a starting position in which the card material is out of contact with the developing roller, through a developing position in which at least a portion of the card material is in contact with the developing roller, and to an end position in which the card material is again out of contact with the developing roller.

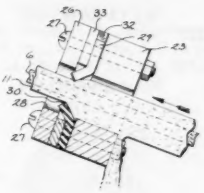
3,874,329

DEVICE FOR COATING A STRAND WITH A BINDING MATERIAL

Jack Lowrie McLarty, Bayside, Wis., assignor to McClean Anderson, Inc., Milwaukee, Wis.

Filed May 29, 1973, Ser. No. 364,626
Int. Cl. B05c *11/02*
U.S. Cl. 118—125 **5 Claims**

1. An apparatus for applying a liquid binder to a strand comprising means for moving the strand through a path of travel, binder applying means for applying a coating of a binder to the strand as it moves through its path of travel, a flexible membrane following the binder applying means in the direction of travel of said trand, said membrane having a hole to receive the strand, said hole having a size substantially equal to the cross sectional area of the strand and the desired thickness of resin coating to be applied to the strand, the annular portion of the membrane bordering the hole flexing in the direction of travel of the strand as the strand passes there-



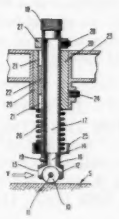
through to thereby meter a uniform coating of said binder on said strand, and means for varying the amount of flexing of said annular portion to thereby vary the thickness of the coating of binder applied to said strand.

3,874,330

APPARATUS FOR APPLYING STRIPS OF RESISTIVE MATERIAL

Gino Zoccolini, Milan, Italy, assignor to Saint-Gobian Industries, Neuilly sur Seine, France

Continuation-in-part of Ser. No. 860,575, Sept. 24, 1969,. This application Feb. 8, 1972, Ser. No. 224,557
Claims priority, application France, Sept. 27, 1968, 68.167881
Int. Cl. B05c *1/02*
U.S. Cl. 118—207 **1 Claim**

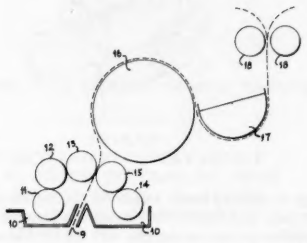


1. Apparatus for simultaneously applying a plurality of parallel strips of electrically conductive resistive material to an insulating sheet, said apparatus comprising a frame and a plurality of applicators, each of said applicators including a cylindrical support adjustably fixable in the frame and a tubular reservoir slideably positioned in the support, the support and reservoir having interengaging means to permit relative axial motion and to prevent relative rotation therebetween, each of said applicators further including a toothed wheel supported in a restricted channel formed at the lower end of the reservoir for rotation about an axis transverse of the length of the reservoir, the angular opening of the teeth of the wheel being substantially 45°, resilient means engaged between the support and reservoir urging the reservoir in the direction toward the toothed wheel, and means affixed to the reservoir to limit motion of the reservoir in that direction.

3,874,331
APPARATUS FOR APPLYING LIQUID TO A WEB

Bernard Kirsen, London, England, assignor to GAF Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 107,278, Jan. 18, 1971, abandoned. This application Nov. 1, 1972, Ser. No. 302,745
Claims priority, application United Kingdom, Oct. 16, 1972, 47635/72
Int. Cl. B05c *1/08*
U.S. Cl. 118—227 **10 Claims**

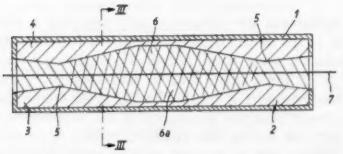


1. In an apparatus for applying a film of liquid developer to both sides of a moving web of exposed photosensitive material of the type having means for advancing such web, first and second liquid pick-up rollers, liquid supply means for applying a film of liquid to said first and second liquid pick-up rollers, a liquid transfer roller having a surface adapted to retain liquid in rotatable contact with the first liquid pick-up roller, and a liquid applicator roller in rotatable contact with said liquid transfer roller and adapted to apply liquid to the exposed surface of said moving web, the improvement comprising a backing roller in rotatable contact with the second liquid pick-up roller to receive liquid therefrom, and arranged to cooperate with the applicator roller to define a nip through which the web is advanced; said backing roller having an array of evenly spaced protuberances having sides thereof inclined at an angle to a line normal to the surface of said backing roller and sloping toward each other, integrally formed on the surface thereof and arranged in a diagonal pattern with respect to the rotational axis of said backing roller to uniformly apply a controlled amount of liquid to the unexposed surface of said web to prevent curling.

3,874,332
APPARATUS FOR TREATING FILAMENTARY MATERIAL

Erhard Meinel, Wallensteinstr 24, 8192 Geretsried, Germany

Filed Aug. 8, 1974, Ser. No. 495,792
Int. Cl. B05c *11/00;* **118** *264;270*
U.S. Cl. 118—264 **12 Claims**

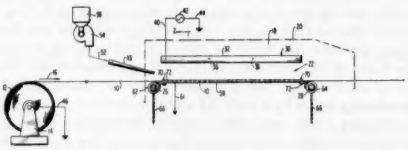


1. In an apparatus for treating filamentary material, elongated tubular enclosure means having opposed open ends and surrounding a given axis, said enclosure means being longitudinally split and including a pair of units which have inner surfaces engaging each other when said units are in an operative position where said enclosure means surrounds said axis, said units being movable one with respect to the other to a non-operative position where said inner surfaces are spaced from each other, and each of said units being formed at said inner surfae thereof along said axis with a longitudinal recess extending along the entire length of each unit between the opposed ends thereof and having between the latter opposed ends a pair of constricted portions which are longitudinally spaced with respect to each other, the pair of constricted recess portions of one unit being longitudinally aligned with the pair of constricted recess portions of the other unit when said units are in their operative position so that said recesses define for said enclosure means a hollow interior which is constricted at a pair of longitudinally spaced locations, and a pair of compressible absorbent means respectively situated in and filling said recesses at least between and in the region of said constricted recess portions, so that said pair of absorbent means engage each other when said units are in their operative position, whereby a supply of treating fluid can be provided in said pair of absorbent means between said constricted hollow interior locations and an elongated filamentary material can be situated substantially along said axis between and engaging said pair of absorbent means, so that longitudinal movement of said filamentary means of said enclosure means, one with respect to the other substantially along said axis, will result in first cleaning the filamentary material at one of said constricted hollow interior locations and then applying said treating fluid to the filamentary material between said constriction locations.

3,874,333
PREVENTING EDGE WRAP-AROUND IN ONE-SIDE ELECTROSTATIC COATING

James N. Baker, McKees Rocks, Pa., assignor to National Steel Corporation, Pittsburgh, Pa.

Filed Sept. 28, 1972, Ser. No. 293,088
Int. Cl. B05c *5/00*
U.S. Cl. 118—621 **8 Claims**



1. Continuous-strip electrostatic coating apparatus, comprising

means defining an electrostatic coating region,

transport means for conducting a continuous strip having opposite surfaces and having opposite edges along a direction of travel through the coating region for deposition of particulate coating material on one of the surfaces of the strip,

means for connecting the strip to a source of electrical potential, and

barrier means in the coating region for preventing coating material from bypassing the edges of the strip and depositing on the other surface of the strip,

the barrier means including

a barrier member extending along each edge of the strip,

mounting means for mounting the barrier members in contact with the respective strip edges, and

means for connecting the barrier members to the source of electrical potential of the strip,

the mounting means including

movable means supporting the barrier member for movement transversely to the direction of travel of the strip to accommodate movement of the strip transversely to the direction of travel, and

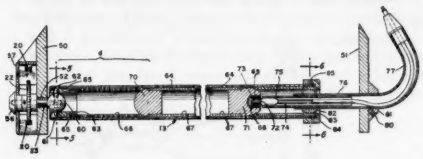
pressure means for yieldably urging the barrier members into continuous contact with the strip edges.

3,874,334

ROTATABLE GRID ASSEMBLY

Kenneth E. Roberts, Providence, R.I., assignor to Indev, Inc., Pawtucket, R.I.

Filed Aug. 29, 1973, Ser. No. 392,543
Int. Cl. B05c *5/02*
U.S. Cl. 118—621 **13 Claims**



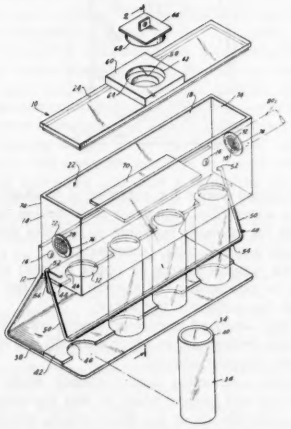
1. In a rotatable grid assembly for an electrostatic flocking apparatus, the combination which comprises: a grid tube extending across said chamber and having a driven end and an electrode end, drive means at the driven end of said grid tube, for rotating said tube, an electrical socket within the electrode end of said grid tube, an electrical conduit connected to an external source of electricity and extending into said chamber and constructed to extend into said electrical socket to make an electrical connection, said connection including a rotatable contact which is shaped to form a relatively rotatable electrical connection, support means including a self-aligning bearing supporting said electrode end of said grid tube including an inner race carried by said electrical conduit and an outer race securable to said grid tube and means for maintaining said outer race in position on said grid tube.

3,874,335

EXPERIMENTAL STUDY STATION

Vincent G. Galasso, 3676 Edgehill Rd., Yorktown Heights, N.Y. 10598

Filed Jan. 11, 1974, Ser. No. 432,697
Int. Cl. A01k *1/00*
U.S. Cl. 119—1 **18 Claims**



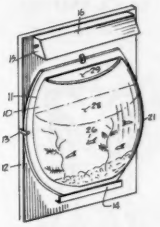
1. An experimental study station comprising an enclosed tank having at least one opening therein and adapted to hold a life form for study; at least one vial having an open end positioned adjacent the opening in said tank for containing an experimental material to be supplied to said life form, and means for removably holding said vial in a fixed position with respect to said opening; said tank having a second opening formed therein, and closure means for selectively opening and closing said second opening to permit cleaning of said tank and insertion and removal of life forms therefrom; and a frame having upper and lower end portions; said tank having a bottom wall with said one opening formed therein and being mounted on the upper end portion of said frame and said vial being positioned in said frame below said tank.

3,874,336

WALL AQUARIUM

Vivian G. Murphy, Arvada, Colo., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Oct. 19, 1973, Ser. No. 407,861
Int. Cl. A01k *64/00*
U.S. Cl. 119—5 **3 Claims**



1. A fishbowl adaptable for mounting against a vertical surface, formed of a flat panel bonded to a transparent convex shaped panel, with an opening provided in the top section of the convex panel,

said flat panel extending beyond the perimeter of the juncture of the convex panel to the flat panel, to form a border section of the fishbowl, together with

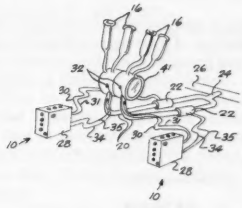
a mounting frame in which the fishbowl is detachably retained, said mounting frame incorporating a flat surface, of equal or greater length and width than the maximum length and width of the said flat panel of the fishbowl, with clip members fitted on said mounting frame which fasten about the edges and over the front face of the flat panel of the fishbowl.

3,874,337

TEMPERATURE RESPONSIVE SYSTEM FOR MILKING APPARATUS

Raymond E. Umbaugh, 4150 Baseline Rd., Boulder, Colo. 80303, and Jerry H. Polson, 7823 Greenbriar Cir., Boulder, Colo. 80301

Filed July 30, 1973, Ser. No. 384,009
Int. Cl. A01j *7/00*
U.S. Cl. 119—14.15 **27 Claims**



1. A temperature responsive system for a milking apparatus having milk receiving and conducting means for receiving milk from an animal being milked at a milking area and conducting the received milk from said area, said system comprising:

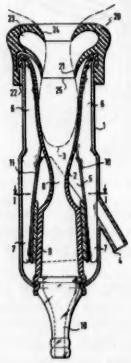
temperature sensing means having at least a portion at said receiving and conducting means for sensing the temperature of milk within said receiving and conducting means;

signal developing means connected with said temperature sensing means for providing an output signal indicative of milk flow rate based upon said sensed temperature; and utilization means connected with said signal developing means and responsive to an output signal therefrom.

3,874,338
MILKING CUP

Fritz Happel, Schwarzwaldstr, 17, 722 Schwenninger, Germany

Filed Oct. 5, 1973, Ser. No. 404,113
Claims priority, application Switzerland, Oct. 9, 1972, 14741/72; Germany, Apr. 9, 1973, 2317732
Int. Cl. A01j *5/16*
U.S. Cl. 119—14.53 **11 Claims**



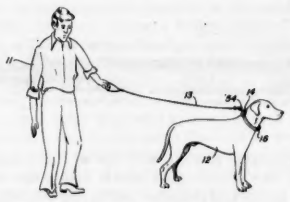
1. A milking cup comprising
a tubular casing;
a resilient deformable sleeve located in said casing to extend therethrough forming an inner space to receive a nipple therein;
said sleeve secured to the ends of said tubular casing to form a longitudinally extending outer space between said sleeve and said casing;
at least one hollow body variable in volume and extending longitudinally through said outer space;
said body comprising an upper massage portion that is variable in volume to exert pressure on said sleeve as it surrounds a nipple held therein and further comprising a lower control portion, said massage portion and said control portion having their inner volumes connected together;
an aperture formed in said casing and opening to said outer space for application of varying pressures to said outer space, said varying pressure controlling contraction of the volume of said control portion to effect a corresponding change and expansion of the volume of said massage portion, and further allowing expansion of said control portion with corresponding contraction of said massage portion.

3,874,339
ANTI-PULL ANIMAL LEASH MECHANISM

John Coulbourn, R.D. 2, New Tripoli, Pa. 18066

Filed June 26, 1974, Ser. No. 483,939
Int. Cl. A01k *27/00*
U.S. Cl. 119—29 **7 Claims**

1. A device, suitable for attachment to an animal collar, for automatically preventing the animal from pulling excessively on a leash, comprising
a. a housing adapted for attachment to an animal collar;
b. a pair of electrodes adapted to contact the body of an animal;
c. an electronic circuit, housed within said housing, and coupled to said electrodes, for providing electronic pulses to said electrodes;
d. means for coupling said electrodes to said circuit;
e. means for providing a power source to said electronic circuit; and

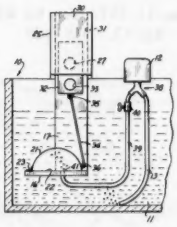


f. means for actuating said electronic circuit including a spring loaded switch affixed to said circuit and including means external to said housing for coupling to a leash, whereby, when said spring loaded switch has a force exerted thereupon, exceeding a predetermined lightly applied force, electronic pulses are provided to said electrodes.

3,874,340
AQUARIUM TANK FEED SYSTEM

Robert H. Lemond, R.R. No. 1, Box 190, and Donald E. Lemond, R.R. No. 1, Box 8, both of Ellsworth, Mich. 49729

Filed Oct. 19, 1973, Ser. No. 407,873
Int. Cl. A01k *61/02*; **272** *8*
U.S. Cl. 119—51 R **6 Claims**



1. An actuating device for actuating a mechanism associated with a water filled aquarium tank having an aerating pump means for normally pumping air bubbles into the tank water through a supply pipe, comprising:
a plate-like support having an upper support surface and means for positioning the support within the tank, well beneath the surface of the water;
a dome-like, inverted container having an open bottom defined by bottom edges which normally are rested upon the upper support surface;
pivot means connecting said container along one edge thereof, to said support plate, so that the container may swing upwardly about the pivot means, away from the support surface and then downwardly back upon the support surface;
an air diversion tube having an end formed for connection to the aerating pump means and having an air control valve means arranged within said tube, for diverting a controlled quantity of air bubbles away from the normal supply to the tank water and through the tube;
the opposite end of said tube being connected to said support and opening beneath said container for feeding the diverted air bubbles into the container while the con-

tainer is in its downward position, that is, rested upon the support;

whereby after a predetermined time, related to the rate of feed of air bubbles diverted through the tube and into the container, the quantity of air collected within the container causes the container to swing into its upward position until the air escapes therefrom and is replaced by water, so that the container swings down again;

and link means having a first end connected to the container and a second end connected to the mechanism to be actuated, said link for translating pivotal movement of the container into linear movement of the mechanism at the second end of the link for actuating said mechanism in response to the swinging of the container.

3,874,341

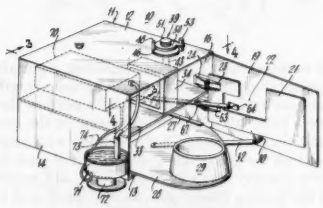
PET TENDING DEVICE

Morris Riba, 2881 W. 12th St., Brooklyn, N.Y. 11224

Filed Oct. 10, 1973, Ser. No. 404,959

Int. Cl. A01k *5/02*

U.S. Cl. 119—51.12 **4 Claims**



1. A timed animal feeding device comprising a food receptacle, a housing enclosing said food receptacle and having an access member including a door defining a wall of said receptacle and supported for swinging about a vertical edge thereof between an opened first position providing access to said food receptacle and a second closed position restricting access to said food receptacle, means resiliently biasing said access member to said first closed position, a latch member movable between a locked position releasably locking said door in its second closed position and a release position releasing said door for movement to its first opened position, a socket member supported in the side face of said door and movable therewith and having a well in its top base, said latch member comprising a rod vertically movable to a locked position engaging said well when said door is in its first closed position and to a raised position above said well, a clock supported by said housing and including a spring wound alarm motor having a winding shaft rotatable in a first direction to load the motor spring and an opposite second direction with the running of said motor to sound said alarm and adjustable means for releasing said alarm motor at a pre-set time, latch control means responsive to the rotation of said motor shaft in said first direction for permitting the movement of said latch member to said locked position and responsive to the rotation of said shaft a predetermined amount in said second direction for advancing said latch member to said release position, said latch control means raising and releasing said rod of said socket member with the rotation of said alarm motor shaft in said second and first directions respectively, said latch control member including a hollow vertical shaft having a lower end gear coupled to said alarm motor shaft and having a coaxial horizontal first disc affixed to the top thereof, said latch member rod slideably registering with said hollow shaft and having a coaxial horizontal second disc secured to the top thereof and disposed above said first disc, cam and cam follower surfaces located in the confronting faces of said first and second discs whereby relative rotation thereof effects the raising of said second disc and latch rod means for limiting the rotation of said second disc and means for limiting the rotation of said first disc relative to said second disc.

3,874,342

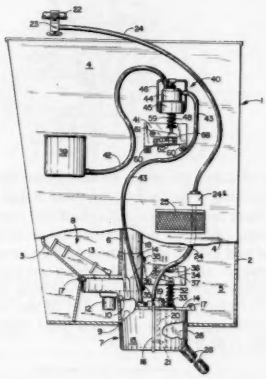
LIQUID SUPPLEMENT PUMP FOR SUCKLING ANIMAL FEEDER

Dale D. Kloss, Osseo, Minn., assignor to K & K Manufacturing, Inc., Rogers, Minn.

Filed Nov. 23, 1973, Ser. No. 418,444

Int. Cl. A01k *9/00*

U.S. Cl. 119—71 **3 Claims**



1. In a suckling animal feeder,

a. a structure defining a reservoir for dry granular food and a mixing chamber having an outlet in its bottom portion;

b. a feeding nipple secured to said outlet;

c. means for delivering dry food and liquid to the mixing chamber and including,

1. a supply container,

2. a pump having a body defining a cylinder having a closed end and an opposite open end, said body including inlet and outlet passageways to the closed end of the cylinder, a piston axially movable in the cylinder, and yielding means urging the piston toward the open end of the cylinder,

3. an inlet conduit extending from the supply container to said inlet passage.

4. a delivery conduit between said outlet passage and said mixing chamber,

5. and check valves in said inlet and delivery conduits;

e. a discharge valve controlling discharge of mixed food and supplement to said outlet;

f. and operating means for the discharge valve and for said mechanism including motor means for closing said discharge valve and causing delivery of said food supplement to the mixing chamber.

3,874,343

WATER DISPENSER FOR SMALL ANIMALS

Motohiro Niki, 22-11, Yushima 2-chome, Bunkyo-ku, Tokyo-to, Japan

Filed Mar. 4, 1974, Ser. No. 447,773

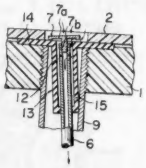
Claims priority, application Japan, Mar. 3, 1973, 48-27122

Int. Cl. A01k *7/00*

U.S. Cl. 119—72.5 **2 Claims**

1. In a water dispenser for feeding small animals, comprising a casing supplied with water and having a water outlet at its bottom; an elastic valve seat sealingly secured in said water outlet and having a horizontal upper planar surface; a poppet valve member having a lower surface normally engaging said planar surface in a water-tight manner; a vertical feed tube

secured to said poppet valve at its upper end and extending downwardly through said valve seat member away from said casing, whereby when said feed tube is inclined said poppet valve is also inclined relative to said valve seat to allow the water in the casing to flow down through a gap formed between said valve seat and said poppet valve; means forming an annular water receiving space for temporarily receiving therein the water which has flowed down through said gap; and aperture means formed through said feed tube to conduct the water in said water receiving space into the interior of said



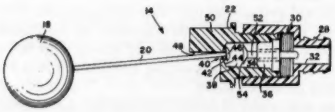
feed tube to cause the water to flow down therein, said valve seat comprising a horizontal annular flange providing said planar surface and an open-top cylindrical portion terminating at a bottom, said feed tube extending vertically through the interior of said cylindrical portion with an annular space interposed between said cylindrical portion and said feed tube, said annular space forming said water receiving space, said aperture means being formed in the part of the feed tube located in said cylindrical portion and at a level higher than the bottom of said cylindrical portion.

3,874,344

SELF-MAINTAINING POULTRY WATERER

Fred R. Smith, P. O. Box 265, Comer, Ga. 30629

Filed Dec. 3, 1973, Ser. No. 421,147
Int. Cl. A01k *7/02*
U.S. Cl. 119—78 **5 Claims**



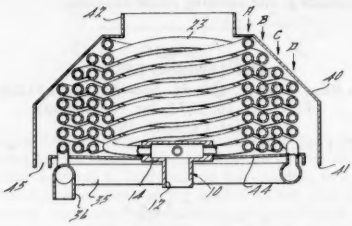
1. A self-maintaining poultry waterer comprising:
a container for water;
conduit means connectable to a supply of water and having an outlet end arranged to deliver water from said conduit means to said container;
valve means at the outlet end of said conduit means, said valve means comprising a discharge port, a valve seat surrounding said discharge port on the upstream side, a valve pin normally extending substantially horizontally through said discharge port and having an annular valve seal disposed at its end on the upstream side of the discharge port, said valve seal being arranged to cooperate with said valve seat to close off the flow of water through said discharge port;
a float secured to the opposite end of said valve pin and adapted to rest on the water in said container, the float, valve pin and valve seal being so arranged that, at a particular water level in the container, the valve seal may be held against the valve seat by the pressure of water in the conduit so that the flow of water into the container is cut off; and
pin means, located on the upstream side of the discharge port and arranged for substantially horizontal sliding movement toward said discharge port, said pin means being responsive to the flow of water through said conduit means when water is turned on for insuring closure of said valve seal against said seat.

3,874,345

VAPOR GENERATOR

Ernest R. Earnest, Hobe Sound, Fla., assignor to The Hydrogen Corporation, Palm Beach, Fla.

Filed Feb. 11, 1974, Ser. No. 441,666
Int. Cl. F22b *27/08*
U.S. Cl. 122—250 R **11 Claims**



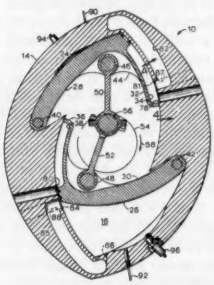
1. A tubular vapor generator including a plurality of vapor generating tubes all of which are of the same length and diameter and each of which has at least a portion thereof in the form of a helix, all of the helices being of the same size and lead and the tubes being interthreaded with respect to one another with the proximate convolutions of each helix spaced from one another in an axial direction, and manifold header means for feeding fluid uniformly into all of such tubes at one end thereof and for withdrawing fluid from the other ends thereof.

3,874,346

INTERNAL COMBUSTION ENGINE

Daniel A. Frietas, San Jose, Calif., assignor to The Foreitas Engine Company, San Jose, Calif.

Filed Feb. 5, 1973, Ser. No. 329,604
Int. Cl. F02b *53/00, 55/00*
U.S. Cl. 123—18 R **12 Claims**



1. An energy conversion device comprising
a. a housing,
b. a crankshaft extending through said housing,
c. a first piston member mounted for reciprocal and pivotal movement in said housing on an axis which is parallel to the axis of rotation of said crankshaft, and
d. a connecting rod pivotally mounted at one end thereof to said first piston member and at the other end thereof to said crankshaft, the shape of said piston member and portions of the internal surfaces of said housing forming a working volume which is approximately triangular in a

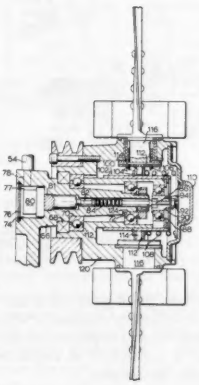
cross sectional plane transverse to the axis of rotation of said crankshaft throughout the stroke of said piston member, the relative dimensions from the axis of said crankshaft to the axis of rotation of said piston, from the axis of rotation of said piston to the connection of said connecting rod with said piston, of the length of said connecting rod, and of the stroke of said piston providing from a "top dead center" position to a "bottom dead center" position of said piston a rotational displacement of said crankshaft greater than 180°.

3,874,347

SHUTTER-FAN SYSTEM

Gordon Elmer Hovey, 2378 Holly Ln., Ottawa, Ontario, Canada (K1V 7P1)

Filed May 1, 1973, Ser. No. 356,141
Int. Cl. F01p *7/02*
U.S. Cl. 123—41.12 **5 Claims**



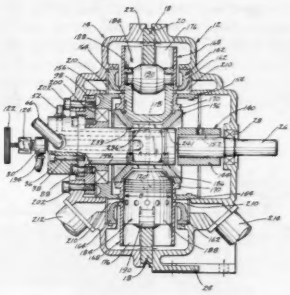
1. A shutter-fan assembly for use with a temperature modifying system, comprising: assembly mounting means for mounting the assembly in spaced relation with a temperature modifying system; a rotor assembly attached in rotatable relation with said mounting means, having a substantially circular array of blades extending outwardly therefrom, at least some of said blades being moveable from a first obturating position to a second, blowing position; thermally responsive means to move the moveable blades from one said position to the other said position, and means to rotate said rotor assembly whereby in operation when in said second blade position the assembly functions as a fan said blades being individually supported on anti-friction mountings for movement between said positions, each blade having a cam spindle off-set from the blade axis of movement, said thermally responsive means including a temperature sensitive pushing element in thermal contact with coolant inlet conditions to the engine, push rod means connected thereto for displacement axially within said rotor assembly, and anti-friction thrust means connecting said push rod means with said blade spindles to accurately position said blades in response to changes in length of said pushing element produced by temperature change in said coolant, said push rod means including a resilient loading device to provide pre-determined pre-load to the push rod means.

3,874,348

ROTARY INTERNAL COMBUSTION ENGINE

Ray T. Townsend, Des Moines, Iowa, assignor to Townsend Engineering Company, Des Moines, Iowa

Continuation-in-part of Ser. Nos. 286,189, Sept. 5, 1972, abandoned, and Ser. No. 301,096, Oct. 26, 1972, Pat. No. 3,857,372. This application July 12, 1973, Ser. No. 378,701
Int. Cl. F02b *57/00*
U.S. Cl. 123—44 B **4 Claims**



1. A rotary internal combustion engine comprising,
an engine frame means including a rotatable power output means,
a rotor means in said frame means connected to said power output means, said rotor means having a central opening, a plurality of cylinders mounted on said rotor means,
a piston movably mounted in each of said cylinders and being movable between compression and expansion positions with respect thereto,
a cam plate means on said frame means extending around said rotor means and having a cam surface,
a roller means mounted on each of said pistons which engages and rolls upon said cam surface to cause said piston to be moved in said cylinder as said rotor means is rotated with respect to said cam plate,
a core means having at least a portion thereof received by said central opening of said rotor means, said rotor means rotatably embracing said core means;
said core means having an air passageway means extending therethrough for supplying air to said cylinders,
said core means having a fuel supply means extending therethrough for supplying fuel to said cylinders,
said rotor means defining a sealing area with respect to said core means, said cylinders having a compression area in said rotor means adjacent said sealing area; the compression area in said cylinders being greater than the sealing area between said rotor means and said core means; said rotor means being flexible so that the combustion forces in said compression area cause the cylinders to urge the rotor means inwardly into sealing engagement with said core means.

3,874,349

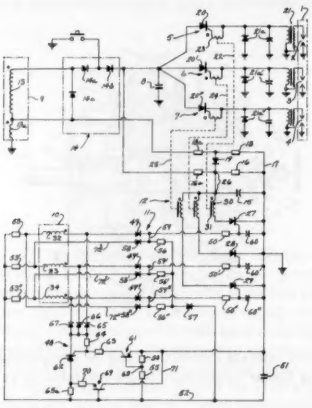
IGNITION SYSTEM FOR MULTIPLE CYLINDER INTERNAL COMBUSTION ENGINES HAVING AUTOMATIC SPARK ADVANCE

Arthur O. Fitzner, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed May 10, 1973, Ser. No. 359,137
Int. Cl. F02p *5/04*
U.S. Cl. 123—117 R **30 Claims**

1. Triggering apparatus for an ignition system for an internal combustion engine for operating a plurality of individual circuits each having a switching means selectively actuated for transferring of energy, comprising a generator having winding

means for establishing triggering signals for each of said switching means, said generator including a cyclically moving means including a first means for establishing first polarity triggering signals in said winding means and a second means similarly coupled to said winding means for establishing second polarity signals in said same winding means, a separate winding means connected to each of said switching means with the first polarity signal actuating the corresponding



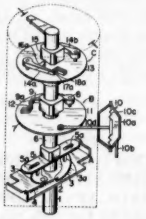
switching means, and circuit means connecting the opposite end of each separate winding means to a different one of said switching means to establish actuation thereof prior to actuation from said corresponding winding means, and an electronic control switch means interconnected to said winding means to effectively disable the circuit means for said second polarity signals and selectively operable to enable said circuit means for said second polarity signals and thereby provide an automatic spark advance control.

3,874,350

IGNITION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Hideo Shiraishi, Hiroshima-ken, Japan, assignor to Toyo Kogyo Co. Ltd., Hiroshima-ken, Japan

Filed Feb. 20, 1974, Ser. No. 444,114
Claims priority, application Japan, Feb. 22, 1973, 48-23379
Int. Cl. F02b *5/00*
U.S. Cl. 123—117 R **12 Claims**



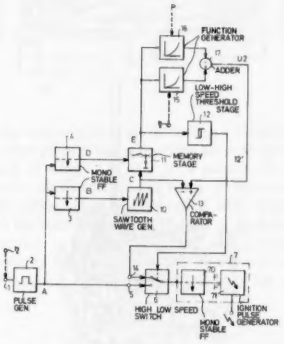
1. Ignition system for an internal combustion engine comprising ignition plug means, first breaker means for determining a standard ignition timing for normal operation of the engine, second breaker means for providing at least two retarded ignition timings including a first retarded timing and a second retarded timing which is less retarded than the first retarded timing, and sequential advance means for changing the ignition timing from said first retarded timing to said second retarded timing and then to said standard ignition timing during engine starting to thereby sequentially advance said ignition timing.

3,874,351

ELECTRONIC IGNITION PULSE GENERATING AND TIMING CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES

Karl-Heinz Asler, Maisons-Laffitte; Andre Bonin, Drancy; Georges Dubuisson, Boissy; Michel Juhe, Paris; Wolfgang Reichardi, Sevres, all of France; Edwin Fauser, Sersheim, and Hermann Eisele, Nellingen, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Feb. 4, 1974, Ser. No. 438,509
Claims priority, application Germany, Jan. 1, 1973, 2304827; Sept. 26, 1973, 2348352
Int. Cl. F02p *5/04, 1/00*
U.S. Cl. 123—117 R **19 Claims**



1. Electronic ignition pulse generation and timing control circuit for internal combustion engines, in which the timing of the ignition pulse with respect to piston position of the internal combustion engine is controlled in dependence on engine operating parameters, comprising

pulse generating means (**2**) to generate a pulse (A) having a predetermined time relation with respect to piston position;

ignition pulse generating means (**7, 70, 71**) to generate ignition pulses for connection to a spark plug of the engine;

engine operation parameter signal generation means (**15,** 16, **17**) providing signals (U2) representative of engine operating conditions;

a sawtooth wave generator (**10**) connected to and controlled by the pulse generator means (**2**);

and means deriving an ignition control signal connected to the ignition pulse generating means (**7, 70, 71**) to control generation of the ignition pulse at a predetermined instant of time with respect to said piston position,

characterized in that

the operation signal parameter generating means comprises at least one function generator (**15, 16**), a storage circuit (**11**) storing an electrical quantity representative of the timing of a prior ignition pulse with respect to said piston position, the output (C) of the sawtooth wave generator (**10**) being connected to the storage circuit (**11**);

a monostable flip-flop (**4**) connected to be triggered (D) by the trailing flank from the pulse (A) of the pulse generating means (**2**), and connecting said storage circuit (**11**) to store a value (e) of the sawtooth wave (C) upon termination of the pulse from the monostable FF (**4**), said value (E) being connected as an input to the function generator, or generators (**15, 16**), to modify the output of the

stored quantity by a function of an operating parameter of the engine, the output from said function generator, or generators forming the output of the engine operating parameter signal generating means;

and a comparator (13) having one input connected to the output of the sawtooth wave generator (13) and another input connected to the output of the function generator, or generators (15, 16) and providing an ignition control signal to said ignition pulse generating means upon coincidence of output from said sawtooth wave generator and said function generator, or generators.

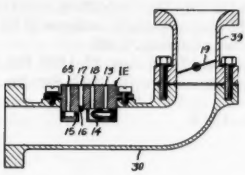
3,874,352
FUEL SUPPLY SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Takashi Ishida, No. 649, Kamisi, Oimachi, Ashigarakamigun, Kanagawa-ken, Japan

Continuation-in-part of Ser. No. 91,618, Nov. 23, 1970, Pat. No. 3,695,245. This application Aug. 29, 1972, Ser. No. 284,555

Int. Cl. F02b *33/00*; **F02m** *7/00*

U.S. Cl. 123—119 R **7 Claims**



1. A fuel supply system in an internal combustion engine comprising a fuel injection element mounted within the engine manifold and forming a transverse impact modulator having first and second supply nozzles opposedly disposed one nozzle of which introduces compressed air and the other nozzle of which introduces fuel to form opposing impacting air jet and fuel jet, said transverse impact modulator having a drain for the fuel jet which is to be drained when injection is not required, a control means connected to said supply nozzles to control the relative strength of said jets of said fuel injection element, said modulator having a control jet nozzle formed at a right angle in the vicinity of the first main supply nozzle and engaging the jet to deflect relative to the opposing jet, a normal running stage circuit means having a pulse output related to the number of revolutions of said engine and connected to said control air jet nozzle of said fuel injection element as a pulse signal, and a mixed air supply stage circuit means connected to said opposed nozzles which supply fuel and air to said fuel injection element and having a control valve means actuated in response to the negative pressure of engine manifold to control the relative supply of fuel and air to said fuel injection element.

3,874,353
AIR AND FUEL MIXING AND FEED SYSTEM

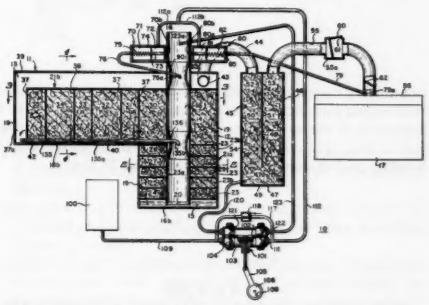
Bobby M. Wooldridge, College Park, Ga., assignor to Lynwood A. Maddox, Decatur, Ga.

Filed Feb. 14, 1974, Ser. No. 442,425

Int. Cl. F02m *17/22*

U.S. Cl. 123—134 **15 Claims**

1. In an air and fuel mixing and feed system wherein an internal combustion engine is equipped with throttle valve means and an induction manifold with said induction manifold intercommunicating downstream of said throttle valve means with said throttle valve means and said engine for said engine on negative pressure therein to take in a mixture of air and fuel from said induction manifold and be controlled by said throttle valve means, the combination which includes; venturi and duct means comprising, air inlet duct means having a passageway therein and said passageway communicating with air ambient to said engine, and with said throttle valve means and said induction manifold through a bath of liquid fuel normally contained in reservoir means of said system for a mixture of air and fuel to be supplied to said engine in response to negative pressure in said engine through said induction manifold and under control of said throttle valve means, and venturi means having an inside open region for developing static pressure in said region varying inversely in intensity with velocity of engine intake air flow induced in said region by said engine; and means for pumping liquid fuel and regulating liquid fuel flow and pressure, the latter said means comprising, pump means for being operated with said engine at a rate increasing and decreasing with operating speed of said engine for pumping liquid fuel, fuel flow regulator means including pressure responsive flow control valve means having a pressure chamber communicating with said region inside said



venturi means and said pressure responsive flow control valve means communicating with a liquid fuel pressurizing chamber in said pump means and with said reservoir means, for said pressure responsive flow control valve means to open in response to static pressure being decreased in said region inside said venturi means and transmitted to said pressure chamber of said pressure responsive flow control valve means for supplying said reservoir means with liquid fuel received from said pressurizing chamber of said pump means, and for said pressure responsive flow control valve means substantially to close when static pressure in said pressure chamber of said pressure responsive flow control valve means is relatively high, and excess pressure alleviating means responsive to fluid pressure beyond a predetermined maximum pressure and communicating for responding to alleviate liquid fuel pressure in said pressurizing chamber of said pump means.

3,874,354
IGNITION ADAPTER CIRCUIT

Thomas J. Crouch, Leonard, Mich., assignor to Syncro Corporation, Oxford, Mich.

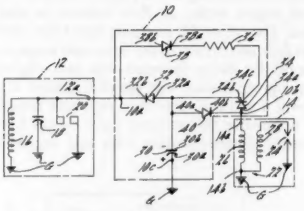
Filed Dec. 14, 1972, Ser. No. 315,139

Int. Cl. F02p *1/00*

U.S. Cl. 123—148 E **9 Claims**

1. For a single-cylinder engine having an existing magneto spark ignition system which comprises a magneto coil for supplying alternating polarity output waveform, an ignition coil having primary and secondary windings, a spark plug operatively coupled with the secondary winding and means operatively coupling the magneto coil with the primary winding comprising a single set of breaker points actuatable between open and closed conditions in timed relation with operation of the engine for causing the spark plug to fire, an adapter assembly for converting the existing magneto spark ignition system to a capacitor discharge ignition system and interconnectable between the set of breaker points and the primary winding of the ignition coil, said adapter assembly comprising a capacitor, input circuit means for operatively

coupling said capacitor with the points and the magneto, said input circuit means comprising means for causing said capacitor to be charged by at least a portion of one polarity of the alternating output waveform of the magneto when the set of breaker points is in one condition and output circuit means for



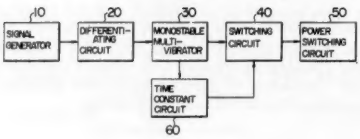
operatively coupling said capacitor with the primary winding, said output circuit means comprising means responsive to the actuation of the set of breaker points to the other condition for causing said capacitor to discharge through the primary winding and thereby cause the spark plug to fire.

3,874,355

IGNITION DEVICE FOR INTERNAL COMBUSTION ENGINE EQUIPPED WITH PROTECTIVE DEVICE

Seiji Suda, Mito; Yasunori Mori, Hitachi, and Shiro Ida, Katsuta, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 8, 1973, Ser. No. 386,549
Claims priority, application Japan, Aug. 9, 1972, 47-79122
Int. Cl. F02p *3/02*
U.S. Cl. 123—148 E **3 Claims**



1. An ignition device for an internal combustion engine, comprising:

input means to which pulses indicative of the ignition timing of an internal combustion engine are applied;

first switching means being switched off at an ignition time in response to the output of said input means;

an ignition coil comprising the primary coil and the secondary coil, said primary coil being connected in series with said first switching means between terminals for supplying a DC voltage, said secondary coil being connected with a spark plug;

time constant means comprising a charge-discharge circuit consisting of a capacitor and a resistor, said charge-discharge circuit having a time constant sufficiently longer than the pulse interval of said pulses, said time constant means producing an output the value of which varies with the lapse of time from the time at which an output of said input means is applied thereto and which reaches a predetermined value after the lapse of time determined by the said time constant; and

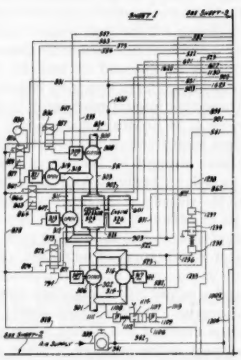
second switching means for turning said first switching means off when the value of the output of said time constant means exceeds a predetermined level, said second switching means comprising a transistor, the emitter and collector of said transistor being connected to one terminal of said DC source and the input terminal of said first switching means, respectively, and the base of said transistor being connected to the output of said time constant means; said resistor and capacitor of said time constant means being connected in series between the base of said second switching transistor and said DC source, and a junction point of said resistor and capacitor being electrically connected with said input means through a first diode, the input terminal of said first switching means being electrically connected with the output of said input means through a second diode.

3,874,356

AUTOMATIC CONTROL SYSTEM

Ray M. Bacchi, Oakland, Calif., assignor to De Laval Turbine California, Inc., Oakland, Calif.

Division of Ser. No. 67,540, Aug. 27, 1970, Pat. No. 3,753,626.
This application Oct. 10, 1972, Ser. No. 295,867
Int. Cl. F01i *13/02*
U.S. Cl. 123—179 F **4 Claims**



1. An automatic control system for an internal combustion engine comprising a starting gas valve, means for cranking the engine, means for supplying spark ignition to the engine, means responsive to engine idle speed, a pneumatic control board having inlet ports and outlet ports connected by ducts, pneumatic logic elements on said board and interposed in said ducts, means including pneumatic connections to said control board for latching said cranking means on and for energizing said spark supplying means, means including pneumatic connections to said control board for opening said starting gas valve, and means including pneumatic connections to said control board for unlatching said cranking means in response to said idle speed responsive means when said engine runs at a predetermined idle speed.

3,874,357
METHOD FOR THE IMPROVEMENT OF MIXTURE FORMATION IN THE CYLINDER OF AN INTERNAL COMBUSTION ENGINE AND INTERNAL COMBUSTION ENGINE OPERATED IN ACCORDANCE WITH THIS METHOD

Hans List, and Erich Schreiber, both of Graz, Austria, assignors to Hans List, Graz, Austria, by said Erich Schreiber

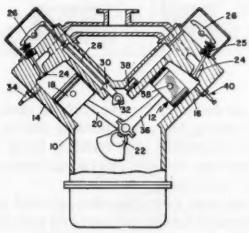
Filed Feb. 29, 1972, Ser. No. 230,228
Claims priority, application Austria, Jan. 11, 1972, 213/72
Int. Cl. F02b *23/00;* **F02m** *29/00*
U.S. Cl. 123—191 M **2 Claims**

1. An internal combustion engine with interior mixture formation, particularly a diesel engine, comprising at least one intake valve arranged eccentrically in relation to the cylinder axis for each cylinder, an inlet port extending from one side of the cylinder head to said intake valve, said inlet port having an elongated supply portion extending from said side of the cylinder head toward the intake valve and a portion adjacent the said supply portion and wound spirally around the intake valve and sloping towards the same, a port tongue formed in said inlet port and extending from said supply portion into said spiral-shaped port portion, said port tongue defining a sharp edge for the current of combustion air in said inlet port, a valve guide bearing extending through said spiral-shaped port portion, said port tongue extending from the valve guide bearing to the outside diameter of the inlet port approximately along a straight line and in tangential relationship to the valve guide bearing and at an acute angle of less than 60° relative to a plane containing the axes of the intake valve and of the associated cylinder.

3,874,358
ENGINE CONVERSION SYSTEM

Harry Bruce Crower, Jamul, Calif., assignor to Crower Cams and Equipment Company, Chula Vista, Calif.

Filed Mar. 20, 1974, Ser. No. 453,086
Int. Cl. F02d *13/06*
U.S. Cl. 123—198 F **10 Claims**

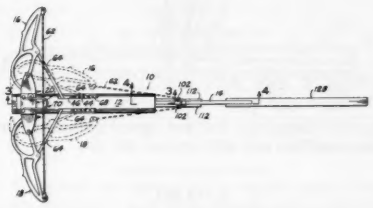


1. In a multi-cylinder internal combustion engine, in which each cylinder has a piston, a spark plug, valves and valve actuating means, the improvement comprising:
piston substitutes replacing the pistons in alternate cylinders in the firing order of the engine, each piston substitute having a diametrical wrist pin receiving bore, an axially extending opening therethrough, and being equal in weight to the respective replaced pistons;
and the valve actuating means in the said alternate cylinders being disconnected.

3,874,359
CROSSBOW WITH COILED SPRING FORCE DEVELOPING MEANS FOR PROJECTING AN ARTICLE

Louie P. Cesin, 2256 S.W. 16 Ct., Miami, Fla. 33145

Filed July 1, 1974, Ser. No. 484,901
Int. Cl. F41b *5/00*
U.S. Cl. 124—16 **4 Claims**



1. A crossbow, comprising:
a casing having a forward end and a rearward end and having opposing longitudinal slots in its wall intermediate its ends;
wing mounting bracket means transversely connected to the forward end portion of said casing for pivoting mounting a pair of wings;
a pair of wings respectively connected, at one end portion, to respective end portions of said bracket means for pivoting movement of their other end portions toward and away from said casing;
a bow string extending between and connected with said other end portions of said wings;
an elongated compression spring within said casing;
push rod means passing through said slots and interposed between said wings and said spring for transfering a biasing force exerted by said compression spring, when the latter is compressed, to said other end portion of said wings in a forward direction to pivot the wings forwardly and cause the bow string to exert a force on a projectile and project a projectile forwardly;
a plate member connected with the rearward end of said casing; and,
trigger means supported by the forward end portion of said stock for releasably holding said bow string in crossbow cocked position.

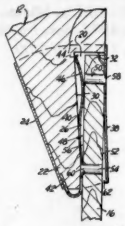
3,874,360
TAKE-DOWN ARCHERY BOW

Laurence Armstrong, and Robert Raisler, both of Oconto Falls, Wis., assignors to American Archery Company, Inc., Oconto Falls, Wis.

Filed Nov. 5, 1973, Ser. No. 412,716
Int. Cl. F41b *5/00*
U.S. Cl. 124—23 R **6 Claims**

1. A take-down archery bow comprising:
a handle;
a socket in at least one end of said handle;
a pair of limbs, at least one of which is a removable limb having an end engageable in said socket;
a first pin projecting from a surface of said removable limb proximate the end thereof;
an aperture in said socket for accepting said projecting pin;
a second pin spaced longitudinally along said at least one of the removable limbs from said first pin, said second pin projecting from an opposite surface of said limb;
an aligning and guiding slot in said socket for accepting said second projecting pin;

said aligning slot and said aperture being spaced apart in said socket; and



means for biasing said first and second projecting pins respectively into said aperture and said slot.

3,874,361

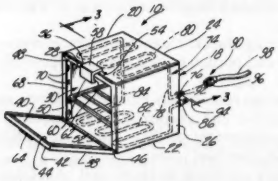
FOOD WARMER

John Parrinello, 8661 Paige, Warren, Mich. 48089

Filed Feb. 13, 1974, Ser. No. 442,050

Int. Cl. B60h *1/04*

U.S. Cl. 126—19.5 **6 Claims**



1. A food warmer device for maintaining foodstuffs in a warm state, the food warmer being associated with a vehicle and comprising:

a. an insulated box having an open side, the box comprising an inner liner and an outer liner and having an insulation sandwiched therebetween,

b. a door rotatably mounted on the box for closing the open side,

c. a closed-loop coil circuit having a portion thereof embedded in the insulation in the box, and having an inlet and an outlet, the circuit further including:

1. quick disconnect means detachably connected to the inlet and outlet,

2. a fluid conveying conduit connected to the quick disconnect means associated with the inlet at the other end, and

3. a fluid conveying conduit connected to the quick disconnect means associated with the outlet at one end thereof and to the heater hose at the other end, and

d. at least one height adjustable rack disposed within the interior of the box.

3,874,362

SPACE HEATING DEVICE USING SOLID FUEL

Alexander Kapustin, 4602 Park Blvd., Oakland, Calif. 94602

Filed Apr. 11, 1974, Ser. No. 459,925

Int. Cl. F24b *3/00*

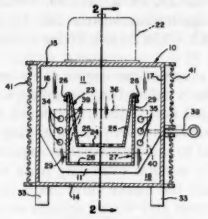
U.S. Cl. 126—67 **8 Claims**

1. A space heating device for burning solid fuel comprising:

a. a chamber having a floor, a ceiling, front, back and side walls,

b. a partition between the side walls of said chamber dividing it into a front combustion zone and a rear venting zone, said partition being substantially sealed against the ceiling of said chamber and the upper portions of the side walls of said chamber and having a lower passageway from said combustion zone to said venting zone,

c. a fire basket maintained in said combustion zone above the floor thereof, said fire basket having a perforated bottom, solid side walls extending into the upper portion of said combustion zone but not in contact with the ceiling thereof, a back wall and an open front,



d. a passageway from beneath the perforated bottom of the fire basket communicating with a source of fresh air,

e. a door for providing fuel to said combustion zone, and

f. a vent for removing combustion products from the upper portion of said venting zone.

3,874,363

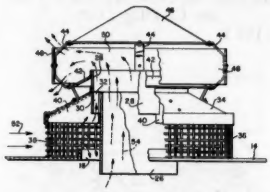
VENT CAP ASSEMBLY FOR EXTERIORLY LOCATED FUEL BURNING UNIT

Raymond F. Biedenbender, Elyria; LaVern H. Clow, Lorain; Richard J. Vales, Elyria, and Donald G. Van Boven, Avon Lake, all of Ohio, assignors to Luxaire, Inc., Elyria, Ohio

Filed Nov. 20, 1973, Ser. No. 417,692

Int. Cl. F23l *17/02*

U.S. Cl. 126—85 B **7 Claims**



1. A vent cap assembly for overlying an opening on the top surface of a housing for a fuel burning unit of the type normally installed exteriorly of a building being served by the unit, and accordingly being subject to variable wind directions and velocities, comprising:

a central flue pipe extending through said opening on the top surface and having its lower end connected to receive flue gas from said fuel burning units;

a frusto-conical lower skirt around said flue pipe, the lower edge of said skirt being spaced upwardly from the top surface of said housing to admit ambient air for combustion purposes to a first space underlying said skirt, said first space being in open communication with the annular opening defined between said flue pipe and the boundary of said opening in said top surface;

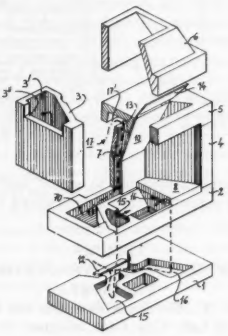
an upper cone-shaped cap spaced above the top end of said flue pipe to define the top of a second space into which flue gas is discharged from the top end of said flue pipe; and

relief passage means placing said first and second spaces in direct communication.

3,874,364
OPEN FIREPLACE FOR LIVING QUARTERS OR THE LIKE

Hans Fauser, Worb, Switzerland, assignor to Superpart AG, Bern, Switzerland

Filed Nov. 19, 1973, Ser. No. 417,396
Claims priority, application Switzerland, Dec. 6, 1972, 17687/72
Int. Cl. F24b 7/00
U.S. Cl. 126—121 6 Claims

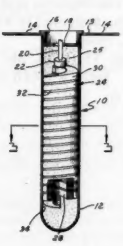


1. An open fireplace for living areas or rooms or the like, comprising a firebox, side walls, rear wall and flue including an air guide system accommodated in the walls thereof for collecting and heating fresh air, the air guide system including a fresh air catch arranged externally of the room, a downdraft channel which communicates with the air catch and which is subjected to the thermal action of the firebox, the downdraft channel having an air infeed which is situated higher than its air outfeed, an ascending channel for connecting the fresh air catch with the air infeed of the downdraft channel and an updraft channel which is subjected to the thermal action of the firebox, said updraft channel having an air inlet communicating with the downdraft channel air outfeed and an air outlet communicating with the room.

3,874,365
SELF-CONTAINED IMMERSION EXOTHERMIC FUEL CHARGE

Thurman Pava, 126 Woodside Ter., Springfield, Mass. 01108

Filed July 10, 1974, Ser. No. 486,951
Int. Cl. F24j 1/00
U.S. Cl. 126—263 6 Claims

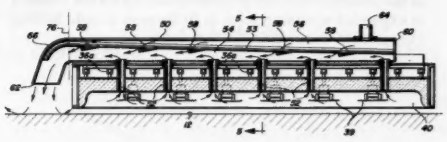


1. Immersion heater comprising a heating charge, including a combustible mixture of unitary helical configuration and a refractory material interposed between adjacent convolutions of the combustible mixture, said heating charge being of tubular cross section from end to end and disposed within a receptacle.

3,874,366
EXHAUST MANIFOLD FOR ASPHALT CONCRETE HEATING APPARATUS

Earl F. Cutler, Lawrence, Kans., assignor to Cutler Repaving Associates, Incorporated, Lawrence, Kans.

Filed July 2, 1973, Ser. No. 375,632
Int. Cl. F23c 5/00
U.S. Cl. 126—271.2 A 13 Claims



1. Equipment for heating of the upper strata of asphalt concrete pavement, or the like, comprising in combination: a heating chamber having chamber-forming walls including a roof adapted to overlie an area of the pavement to be heated, said chamber-forming walls including downwardly extending peripheral side portions having lower edges thereof adapted to be closely spaced to the pavement, heater means positioned within said heating chamber for heating the pavement therebeneath wherein the improvement comprises a horizontally disposed exhaust manifold means positioned over said roof and having an exhaust opening formed at one end thereof, and conduit means formed between said heating chamber and said horizontally disposed exhaust manifold, and passing through said roof, whereby hot gases formed within said chamber, as a result of the products of combustion produced by said heater means, pass through said conduit means to be discharged through said exhaust opening, said exhaust opening being located at an end of said horizontally disposed exhaust manifold means located adjacent a forwardmost portion of said roof and being turned downwardly in front of a frowardmost wall portion of said chamber-forming walls to direct hot gases emanating from said heating chamber onto the pavement preceding said heating chamber when moving over the asphalt concrete pavement in a forward direction.

3,874,367
VALVED BLOOD SAMPLING NEEDLE ASSEMBLY

Waldemar A. Ayres, Rutherford, N.J., assignor to Becton Dickinson and Company, East Rutherford, N.J.

Filed June 29, 1972, Ser. No. 267,559
Int. Cl. A61m 5/00; A61b 5/14
U.S. Cl. 128—2 F 2 Claims

1. A needle assembly for facilitating the collection of a blood sample from a patient into an evacuated collection container while preventing flow of fluid from the collection container into the patient during and after collection of the blood sample comprising:

a housing having a forward end with an opening therein and a rear end with an opening therein with both openings extending into a central chamber in the housing;

a first double ended substantially rigid cannula having a passage therethrough mounted in fixed position in the opening in the forward end of the housing with the forward end of the cannula being pointed for venipuncture and the rear end of the cannula in the chamber of the housing;

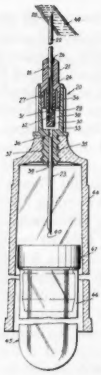
a second double ended substantially rigid cannula having a passage therethrough mounted in fixed position in the opening in the rear end of the housing with the passage opening in the forward end of the second cannula ir fluid communication with the chamber in the housing through the opening in the rear end of the housing and the rear end of the second cannula being pointed for insertion into an evacuated collection container thereby providing a

continuous passage from the forward end of the first cannula to the rear end of the second cannula;

a resilient cylindrically shaped cap of elastomeric self-sealing material having an open end and a closed end;

the opening in the open end extending a substantial distance throughout the length of the cap and being of normally lesser diameter in at least the portion adjacent the open end than the outer diameter of the rear end of the first cannula;

the cap being mounted on the rear end of the first cannula in the chamber with the portion of the cap on the cannula in expanded condition so as to fit thereon in tight sealing engagement therewith; and



at least one slit in the cap aligned with the opening therein and spaced from the portion of the cap mounted on the first cannula with the slit being normally closed; so as to close the passageway through the assembly and being responsive to a reduction in fluid pressure at the rearward end of the second cannula to resiliently deform independent of any force other than the reduction in fluid pressure and independent of orientation of the assembly so as to automatically open the passageway through the assembly, and thereafter be responsive to a predetermined increase in fluid pressure at the rearward end of the second cannula to automatically return to the closed position independent of any other force than the increase in fluid pressure and independent of orientation of the assembly.

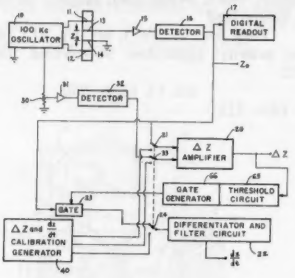
3,874,368

IMPEDANCE PLETHYSMOGRAPH HAVING BLOCKING SYSTEM

Manfred Asrican, Baldwin Farms, South, Greenwich, Conn. 06830

Filed Apr. 19, 1973, Ser. No. 352,426
Int. Cl. A61b *5/02*
U.S. Cl. 128—2.1 Z **2 Claims**

1. In a plethysmograph of the type including means for measuring an impedance in a mammalian subject, means providing a first output corresponding to impedance changes of said measured impedance and means providing a second output corresponding to a time differential of said measured impedance, the improvement comprising a means responsive



to said first output connected to inhibit said second output when said first output exceeds a determined magnitude.

3,874,369

METHOD OF MONITORING VENOUS OR ARTERIAL PRESSURE

Karl A. Pannier, Jr.; Gordon S. Reynolds, and James L. Sorenson, all of Salt Lake City, Utah, assignors to Le Voy's, Inc., Salt Lake City, Utah

Division of Ser. No. 126,439, March 22, 1971, Pat. No. 3,786,810, which is a continuation-in-part of Ser. No. 885,803, Dec. 17, 1969, abandoned. This application Nov. 7, 1973, Ser. No. 413,648
Int. Cl. A61b *5/02*
U.S. Cl. 128—2.05 D **6 Claims**

1. A method of monitoring pulsations and pressure of the blood, including the steps of:

entering an elongated element comprising a blood pressure transmitting vehicle into a peripheral blood vessel of a patient,

smoothly advancing said element, proximally connected to indicating means, through said blood vessel and connecting blood vessels to a point at or adjacent the heart of the patient, and

through said element and with the aid of said indicating means continuously monitoring the pulsations and pressure of the blood during advancement of said element from the point of entry to its ultimate destination, as well as thereafter.

3,874,370

ELECTROCARDIOGRAPHIC WAVEFORM ANALYZER

George J. Harris, Framingham, and Thomas K. Naylor, Belmont, both of Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed Apr. 15, 1974, Ser. No. 461,042
Int. Cl. A61b *5/04*
U.S. Cl. 128—2.06 A **9 Claims**

1. A system for reviewing an ECG signal stored on a recording medium comprising means for reading the ECG signal

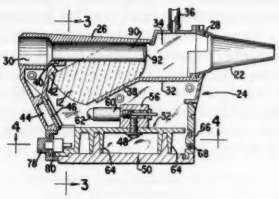
from said recording medium at a rate substantially faster than the rate at which said ECG signal was recorded, first means for temporarily storing successive ECG waveforms read from said recording medium, first recirculating memory means, means responsive to the storage of an ECG waveform in said first temporary storage means for transferring the stored ECG waveform to said first recirculating memory means, second means for temporarily storing a segment of the ECG signal read from said recording medium which is at least long enough to include 2 normal heartbeat cycles, second recirculating memory means, means for detecting an abnormal heartbeat in the ECG signal read from said recording medium and responsive thereto for transferring the temporarily stored ECG signal segment to said second recirculating memory means, means for recirculating an ECG waveform stored in said first recirculating memory means and an ECG signal segment stored in said second recirculating memory means at rates faster than the rates at which an ECG waveform and an ECG signal segment are stored in said first and second temporary storage means, and display means synchronized to the recirculation rates of said first and second recirculating memory means for displaying all ECG waveforms stored in said first recirculating memory means superimposed on each other, whereby ECG waveform traces are formed on said display means at a rate faster than that at which they are read from said recording medium, and for displaying separately the ECG signal segment stored in said second recirculating memory means.

3,874,371

OTOSCOPE

Kenneth P. Stader, Simi Valley, and Allan D. Le Vantine, Tarzana, both of Calif., assignors to Cavitron Corporation, New York, N.Y.

Filed Jan. 11, 1974, Ser. No. 432,779
Int. Cl. A61b *1/06*
U.S. Cl. 128—9 **12 Claims**



1. An optical device comprising

a housing having an eye piece at one end, said eye piece being at one end of an optical viewing axis extending towards a region to be viewed opposite the other end of the housing,

a bi-convex thick lens prism mounted in said housing, said prism having a first convex lens face on one side, a second convex lens face on an opposite side and an internal reflecting surface intermediate said two convex lens faces,

light means mounted in said housing for directing light at said first convex lens faces, said first convex lens directing the light at said internal reflecting surface at an angle of incidence greater than the critical angle, thereby causing the light to be internally reflected, said internal reflecting surface being mounted at such an angle in said housing intermediate the optical viewing axis to direct said reflected light along an axis which is coaxial with the optical viewing axis and through said second convex lens whereby the light illuminates the region to be viewed along the optical viewing axis, and

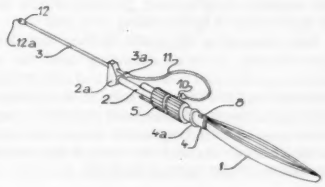
an optical tube located in said housing along the optical viewing axis, said optical tube having viewing lens means for modifying the image of the viewed region.

3,874,372

INSERT FOR ULTRASONIC MEDICAL DEVICE

Alain Le Bon, Societe Minerve-1 bis-3, rue Barbes 92400, Courbevoie, France

Filed Sept. 12, 1973, Ser. No. 396,431
Claims priority, application France, Sept. 13, 1972, 72.32456
Int. Cl. A61h *1/00*
U.S. Cl. 128—24 A **1 Claim**



1. A medical device for applying ultrasonic vibrations to a patient which comprises a hollow handle, an insert supported in said handle, said insert comprising an ultrasonic vibration generator inserted in said handle, a treatment instrument comprising a slender needle provided with a bore passing along its longitudinal axis defining a fluid flow path for flowing a fluid therethrough, said vibration generator having a joining stem protruding from said handle for coactively joining said ultrasonic vibration generator in use to said treatment instrument for applying ultrasonic vibrations developed by said generator to a patient, said treatment instrument having one end bulged with an outlet orifice communicating with said bore for inducing cavitation in said fluid when discharged through said outlet orifice, said hollow handle defining a fluid flow path for delivery of said fluid to said ultrasonic vibration generator to cool said ultrasonic vibration generator, a flexible tubing connected between said flow path in said handle and said flow path in said treatment instrument, and said flow of fluid passing through said bulge and having cavitation induced therein by said bulge in order to reinforce said ultrasonic vibrations.

3,874,373

MASSAGING APPARATUS

P. Brav Sobel, 3140 N. Bay Rd., Miami Beach, Fla. 33140

Filed Apr. 5, 1973, Ser. No. 348,128
Int. Cl. A61h *7/00*
U.S. Cl. 128—49 **9 Claims**

1. A body massaging apparatus including a stroking device for stroking erogenous zones of a body and a powerpack for controlling the motion of said stroking tool wherein said stroking device comprises:

a stroking-device housing;
a stroking-tool extending from said stroking-device housing for making contact with said erogenous zones;
an electric motor mounted in said stroking-device housing for motivating said stroking tool; and
mechanical linkage interconnecting said electric motor and said stroking tool; and said power pack comprises:
a power-pack housing remote from said stroking-device housing;
an electrical energy source mounted in said power-pack housing for supplying electrical energy to energize said electric motor; and
electrical control means mounted on said power-pack housing for turning "on" and "off" electrical energy supplied to said electric motor, and also for controlling the rate of said supplied electrical energy which affects the speed of the movement of said stroking tool; and
said body massaging apparatus further includes an elongated flexible electric-conducting cord for exclusively interconnecting said power pack and said stroking device; whereby, said stroking tool may be brought into contact with said erogenous zones, said electrical energy turned on to cause said stroking tool to move and said electrical control means adjusted to control the nature of said movement of said stroling stroking

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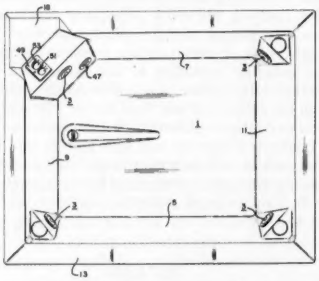
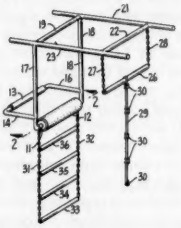
3,874,374
HYDROMASSAGE TUB AND AIR INDUCTION SYSTEM THEREFOR
Roy A. Jacuzzi, Moraga, Calif., assignor to Jacuzzi Research, Inc., Berkeley, Calif.
Filed Feb. 19, 1974, Ser. No. 443,213
Int. Cl. A61h *9/00*
U.S. Cl. 128—66 **7 Claims**



1. A hydromassage system comprising a jet head assembly including a jet nozzle having means for connection to a source of water under pressure, means for introducing air into said nozzle in response to flow of water therethrough, said means for introducing air including an air passageway exposed at one point to atmosphere and at another point to such flow of water, and means permitting entrance of air into said air passageway and flow therethrough to such flow of water through said nozzle, and adapted to block flow of water through said air passageway in the reverse direction in the event discharge of water through said nozzle be blocked.

6. A hydromassage control unit for a system for independently controlling air flow to different jet head assemblies in such system, comprising a housing having side walls, a floor at one end and an end wall at the other end, a pair of air tubes extending through said floor with a portion of each air tube extending outside the housing for coupling to an air line to a jet head assembly, and a portion extending into said housing and terminating in an adjustable air intake valve assembly, an air intake nozzle mounted at one end in a wall of said housing with its other end exposed to atmosphere, and means for controlling each of said air intake valves independently of the other from outside of said housing.

3,874,375
BACK THERAPY AND EXERCISE APPARATUS
John H. Penner, 233 Oak Knoll Rd., Ukiah, Calif. 85942
Filed June 13, 1973, Ser. No. 369,709
Int. Cl. A61h *1/02*; **A63b** *1/02*
U.S. Cl. 128—75 **7 Claims**



1. A back therapy and exercise apparatus, comprising
a horizontal padded knee bar supported in fixed position sufficiently high from the floor for the user to hang suspended by his knees therefrom and allow his weight to stretch his spine,
a padded second bar mounted in parallel horizontally spaced relation to and above said knee bar in position for the user hanging from said knee bar to hook his insteps under said second bar,
a flexible ladder hanging freely from said knee bar and having vertically spaced parallel horizontal rungs,
and a manually engageable third bar mounted in parallel horizontally spaced relation to and above said knee bar on the side thereof opposite to said second bar whereby the user grasps said third bar and walks his feet up said rungs of said flexible ladder until the user can place his knees over said knee bar and his insteps under said second bar.

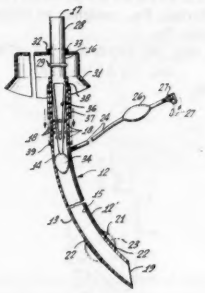
3,874,376
PHOTOCURABLE RESIN IMPREGNATED FABRIC FOR FORMING RIGID ORTHOPAEDIC DEVICES AND METHOD
Edward Charles Dart; Antony Robert Perry, and Josef Nemcek, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England
Filed Nov. 17, 1972, Ser. No. 307,528
Int. Cl. A61f *13/04*
U.S. Cl. 128—90 **27 Claims**

1. In an orthopaedic device forming fabric impregnated with at least one curable material, the improvement wherein the curable material comprises at least one curable organic material comprising a copolymerizable mixture of an ethylenically unsaturated polymer and an ethylenically unsaturated monomer and at least one photosensitive catalyst comprising at least one photosensitizer activatable by visible light having a wavelength in the range 4,000 A to 7,500 A, and at least one reducing agent capable of reducing the photosensitizer when the photosensitizer is in an activated state, the photosensitive catalyst being capable of curing the organic material to convert the impregnated fabric article into an immobilizing orthopaedic device upon exposure of the impregnated fabric article to said visible light.

3,874,377
APPARATUS FOR ENDOTRACHEAL AND ESOPHAGEAL INTUBATION

Kenneth L. Davidson, 12735 11th Ave., Victorville, Calif. 92392

Filed June 6, 1974, Ser. No. 476,955
Int. Cl. A61m *16/00*
U.S. Cl. 128—145.5 **14 Claims**



1. Apparatus for endotracheal and esophageal intubation, said apparatus comprising:

an elongated tubular body having an open outer and open inner end, said tubular body defining an upper portion and a flexible lower portion and a lumen extending between said outer and inner ends;

means in said upper portion for selectively sealing said lumen; and

means for selectively providing fluid communication between said outer end and the exterior of said upper portion, said means being spaced between said outer end and said sealing means;

means carried about said lower portion of said tubular body for insertion within a body canal to form a seal with the walls thereof;

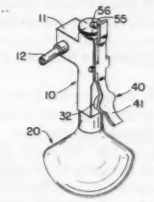
whereby said apparatus is adapted for endotracheal intubation when said lumen is open for fluid communication between said outer end and said inner end and said apparatus is adapted for esophageal intubation when said lumen is sealed and adapted for fluid communication between said outer end and the exterior of said upper portion.

3,874,378
COMBINED RESUSCITATOR AND INHALATOR APPARATUS

Max Isaacson, and Benjamin Smilg, both of Dayton, Ohio, assignors to Globe Safety Products, Inc., Dayton, Ohio

Filed Sept. 6, 1973, Ser. No. 394,744
Int. Cl. A62b *7/00*
U.S. Cl. 128—145.8 **13 Claims**

1. In apparatus for supplying compressed oxygen to a face mask and including a valve body defining a chamber, means defining an inlet within said body for directing a supply of compressed oxygen into said chamber, means defining an outlet within said body for connecting said chamber to the face mask, a control valve associated with said inlet for controlling the flow of oxygen into said chamber and including a movable valve member, an actuating lever pivotally supported by said body for manual movement from a closed position to an open position for moving said valve member from a closed position to an open position to provide a full flow rate of oxygen to said mask during resuscitation, spring means for urging said lever in a direction towards said closed position, means defining an exhaust port for said chamber to provide for an escape of exhaled air received from the mask, and a closure member supported for movement between an open position and a closed position relative to said exhaust port in response to movement of said lever, the improvement comprising means for retaining said lever in an intermedite position to locate said valve member in a partially open position for supplying a continuous partial flow rate of oxygen to said

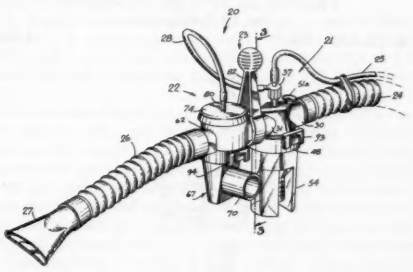


face mask during inhalation, and said closure member is effective to move to said open position for opening said exhaust port when said lever is located in either of said intermediate or closed positions to provide for substantially unrestricted exhalation through said port during both inhalation and resuscitation.

3,874,379
MANIFOLD NEBULIZER SYSTEM

Stuart A. Enfield, Rutherford, N.J., and Robert A. Gandi, New York, N.Y., assignors to Becton, Dickinson and Company, East Rutherford, N.J.

Filed Aug. 15, 1973, Ser. No. 388,486
Int. Cl. A62b *7/02*
U.S. Cl. 128—194 **1 Claim**



1. A disposable plastic manifold nebulizer system for use in a breathing circuit comprising:

a nebulizer module including a cap portion having a chamber therein and a through passageway thereacross;

means on the cap portion forming at least one side of said through passageway for removal connection to a main source of gas to facilitate passage of gas through the cap portion;

the cap having a depending skirt with means thereon for receiving in sealed relationship a vial designed to contain liquid;

means forming an opening in the cap and for the cap to be removably connected to a secondary source of gas;

a nozzle depending inwardly of the cap in alignment with the opening in the cap and in fluid communication with the gas from the secondary source passing through the opening in the cap so as to direct the gas at high velocity into the chamber;

a tube in the cap and extending beyond the depending skirt so as to extend into the vial connected with the cap with one open end adjacent to and in fluid communication

with the nozzle and the other open end in liquid contained in the vial so that when secondary gas passes from the nozzle it will entrain liquid from the tube and atomize said liquid into the gas stream baffle means in the cap to assist in removing large liquid particles in the chamber and to direct a portion of the primary flow of gas into the cap into communication with the aerosol to provide a homogenized mixture into the main gas flow passageway for discharge from the nebulizer module;

an exhaust module having a body portion with a through passageway;

an exhaust valve assembly on the body portion including an exhaust opening;

means for removably coupling the part of the exhaust module containing one end opening of the through passageway therein to a patient connection;

adjustable surfaces on the manifold nebulizer to permit relative movement between the modules thereof; and

releasable connection means on the nebulizer module and the exhaust module to permit the interconnection therebetween to provide an interchangeable configuration which could take the form of serial and parallel relationship between the modules thereby facilitating function of the manifold nebulizer with the nebulizer module and exhaust module in desired relative position to thereby facilitate use of the nebulizer in a variety of different breathing circuit configurations whereby when the nebulizer is connected to a primary gas source and a patient inhales an aerosol of liquid particles will be inhaled, and when the patient exhales, the valve assembly will open permitting the expired vapors to pass through the exhaust opening and out of the circuit.

3,874,380

DUAL NOZZLE INTRANASAL DELIVERY DEVICE

Ronald Baum, Merion, Pa., assignor to Smithkline Corporation, Philadelphia, Pa.

Filed May 28, 1974, Ser. No. 473,372

Int. Cl. A61m *3/00*

U.S. Cl. 128—206 **1 Claim**

1. A dual nozzle intranasal delivery device comprising:

a housing,

said housing having a cavity for the reception of a container having a pierceable stopper,

an opening for the reception of a syringe nozzle and a passage connecting said cavity and said opening,

a hollow needle secured in said passage by a pressed fit and extending into the cavity, said needle being adapted to penetrate the stopper of said container,

a pair of adjacent nozzles having substantially parallel axes, said housing having a conduit communicating with said nozzles and having a second opening for the reception of a syringe nozzle, and a second passage connecting said second opening with said nozzles,

whereby liquid can be introduced into and withdrawn from a container and then discharged through the nozzles.

3,874,381

DUAL NOZZLE INTRANASAL DELIVERY DEVICE

Ronald Baum, Merion, Pa., assignor to Smithkline Corporation, Philadelphia, Pa.

Filed May 28, 1974, Ser. No. 473,373

Int. Cl. A61m *3/00*

U.S. Cl. 128—206 **2 Claims**

1. A dual nozzle intranasal delivery device comprising:

a housing,

said housing having a cavity for the reception of a container having a pierceable stopper and a first passage communicating with said cavity,

a hollow needle secured in said passage and extending into the cavity, said needle being adapted to penetrate the stopper of said container,

a pair of adjacent nozzles having substantially parallel axes a second passage in said housing communicating with said nozzles,

a cylindrical opening in said housing,

each of said passages communicating with said opening.

a turret member mounted in said cylindrical opening and having a passage of which one end alternatively communicates with the first and second passages and the other end is provided with an opening for the reception of a syringe nozzle whereby a syringe can be placed in communication with the container and then by rotation of the turret placed in communication with the second passage.

3,874,382

SEALING PISTON CAP FOR HYPODERMIC INJECTION SYRINGE

Louis Nogier, 11 Quai Claude Bernard, 69007 Lyon, France, and Paul Nogier, 108, rue du Dr. Edmond Locard, 69005 Lyon, France

Filed Apr. 2, 1973, Ser. No. 347,325

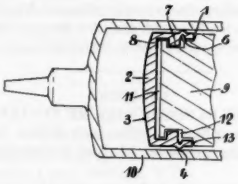
Int. Cl. A61m *5/18*

U.S. Cl. 128—218 P **5 Claims**

1. In a syringe having a cylinder, a piston slidable therein and a resilient sealing cap on said piston, the improvements comprising:

said sealing cap being of generally cup shape, having an end wall extending across the end of said piston and a single skirt portion extending loosely between said piston and cylinder;

an integral annular sealing ring extending circumferentially around said skirt in sliding engagement with said cylinder,



said sealing ring being in the form of a thin-walled rib and defining and annular groove at the inner side of said skirt; and

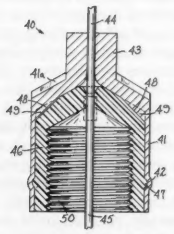
a solid annular rib, integral with said skirt on the inner surface of said skirt between said sealing ring and said end wall, said rib extending into an annular groove in said piston.

3,874,383

HYPODERMIC NEEDLE WITH DISTORTABLE HUB LINER

John J. Glowacki, 335 Hotchkiss Rd., Orange, Conn. 06477

Filed Mar. 21, 1973, Ser. No. 343,564
Int. Cl. A61m *5/32*
U.S. Cl. 128—221 **8 Claims**



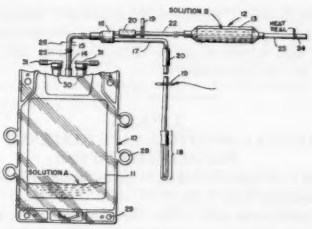
1. A hypodermic needle comprising a cannula, a metal hub having walls defining a well and a smaller nose portion, said nose portion receiving said cannula and securing said hub to said cannula, a plastic liner received within said hub well and having walls defining an inner well and covering the walls of said hub, said cannula extending into said liner, and means defined on the interior of said hub and the exterior of said liner in interlocking engagement to prevent rotational and axial movement of said liner with respect to said hub, said liner being of a material which is heat distortable at normal sterilizing temperatures.

3,874,384

IMPROVED BLOOD STORAGE UNIT AND METHOD OF STORING BLOOD

Fred H. Deindoerfer, Northridge, and Jon M. Brake, Burbank, both of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

Continuation-in-part of Ser. Nos. 194,652, Nov. 1, 1971, Pat. No. 3,847,378, and Ser. No. 194,689, Nov. 1, 1971, Pat. No. 3,795,581. This application Mar. 29, 1973, Ser. No. 345,961
Int. Cl.[2] A61J *1/00;* **A61K** *17/00;* **C12K** *9/00*
U.S. Cl. 128—272 **15 Claims**



1. A blood storage unit comprising a container for receiving and storing a predetermined volume of blood and preservative solution admixable with the blood stored in said container, said preservative solution being sterile and providing a sugar energy source and an anti-coagulant for preserving said blood, said preservative solution also providing for cooperative admixture with said stored blood an amount of dihydroxyacetone (DHA) equal to 5 to 100 millimoles (mM) per liter of said predetermined blood volume together with an amount of L-ascorbate equal to 0.5 to 20 mM per liter of said predetermined blood volume.

10. A preservative solution for addition to stored blood, comprising a sterile aqueous solution of dihydroxyacetone (DHA) and L-ascorbate, said solution containing from 0.5 to 20 mM of said L-ascorbate per each 5 to 100 mM of said DHA.

12. A heat-sterilized blood storage unit, comprising a container for receiving and storing a predetermined volume of blood, a first sterile aqueous preservative solution in said container, means providing a separate compartment, a second sterile aqueous preservative solution in said compartment, means permitting said second solution to be introduced into said container for admixture with said first solution and with said predetermined volume of blood, said first and second solutions together providing a sugar energy source, an anti-coagulant, an amount of dihydroxyacetone (DHA) equal to 5 to 100 millimoles (mM) per liter of said predetermined blood volume, and an amount of L-ascorbate equal to 0.5 to 20 mM per liter of said predetermined blood volume, said L-ascorbate being contained only in one of said first and second solutions prior to said admixture thereof, and said sugar energy source and said DHA being contained only in the other of said first and second solutions.

3,874,385

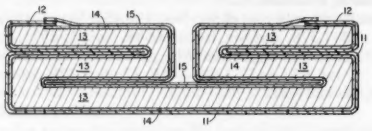
LAMINATED DIAPER TOPSHEET TO PROVIDE DISPOSABILITY OF SOLID WASTES

Dale Albert Gellert, Aurora, Ind., assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sept. 17, 1973, Ser. No. 397,530
Int. Cl. A61f *13/16*
U.S. Cl. 128—287 **2 Claims**

1. In a disposable diaper of the type comprising a water-impervious backsheet, an absorbent core superimposed on said backsheet, a generally hydrophobic topsheet overlying and enclosing said absorbent core, and a pair of tape fasteners for securing said diaper in an operative position about the

wearer's waist, the improvement wherein said topsheet comprises two layers and wherein the inter-layer bonding between said topsheet layers is less strong than the intra-layer bonding between said topsheet and the remainder of said diaper, said



diaper including a topsheet delamination initiation means comprising a release liner for at least one of said tape fasteners whereby said topsheet can be delaminated to allow separate disposal of the layers thereof.

3,874,386

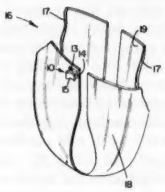
PRESSURE-SENSITIVE TAPE FASTENER FOR DISPOSABLE DIAPERS

Theodore F. Kozak, Peekskill, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 402,088, Oct. 1, 1973, abandoned. This application Mar. 19, 1974, Ser. No. 452,609

Int. Cl. A61f *13/16*

U.S. Cl. 128—287 **9 Claims**



1. In a disposable diaper having a top sheet, a backing sheet and an absorbent core interposed therebetween, a means for providing self-stored protective access to a portion of the adhesive surface of a diaper tape fastener comprising, a pressure-sensitive tape fastener having an upper surface and a lower surface, said lower surface being divided widthwise into two end segments at least one of which is adhesively treated and a middle segment containing a release agent, one of said end segments being a fixed end segment which is secured to said backsheet, the other of said end segments being a releasable end segment; said fastener being folded in manner such that said releasable end segment and said middle segment are superimposed over said fixed end segment with the lower surface of said releasable end segment being in contacting relation and releasably secured to the lower surface of said middle segment.

3,874,387

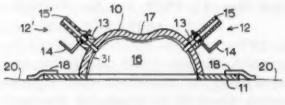
VALVED HEMOSTATIC PRESSURE CAP

Pasquale P. Barbieri, 5300 N.W. 17th Court, Lauderhill, Fla. 33313

Filed July 5, 1972, Ser. No. 269,273

Int. Cl. A61b *17/04*

U.S. Cl. 128—325 **7 Claims**



1. A device for dressing a wound comprising:

a body having a blood receiving chamber, said chamber having an opening for receiving a wound, said opening having a peripheral edge, at least one conduit having a first end connected to and opening into said body chamber

at least one manually operable closeable valve, said valve having an open position and closed position, said valve being connected to said conduit for stopping or allowing the flow of blood through said conduit; and

means for attaching the chamber edge of the body to the skin surrounding the wound, whereby bleeding from a wound may be lessened and the flow of blood downstream of the wound may be increased.

3,874,388

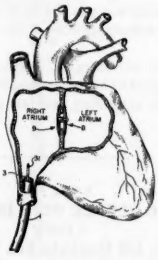
SHUNT DEFECT CLOSURE SYSTEM

Terry D. King, and Noel L. Mills, both of New Orleans, La., assignors to Alton Ochsner Medical Foundation, New Orleans, La.

Filed Feb. 12, 1973, Ser. No. 331,559

Int. Cl. A61b *17/04*

U.S. Cl. 128—334 R **30 Claims**



1. A shunt defect closure apparatus for closing off a shunt defect in the septum of for example the intravascular system comprising:

mechanical expansion means having an initial size substantially smaller than the diameter of the shunt defect to be closed during its preliminary handling and a final size substantially larger than the diameter of the shunt defect when it is positioned over and across the shunt defect to permanently close it off after being expanded to its larger size, said expansion means comprising a dual set of umbrella-like structures for placement on opposite sides of the shunt defect, the umbrella-like structures having central hub means for connecting said dual set of umbrella-like structures together through the shunt, each said umbrella-like structures including a series of relatively hard, strut-like members emanating out from said central means in at least a generally perpendicular, radial direction when said expansion means is in its final size and in at least a generally parallel, axial direction when said expansion means is in its initial size; and

operative means removably connected with said expansion means for at least temporarily holding the said expansion means on to the shunt defect after at least one of said umbrella-like structures has been expanded out to its final size.

11. A shunt defect closure apparatus for closing off a shunt defect in the septum of for example the intravascular system comprising:

mechanical expansion means having an initial size substantially smaller than the diameter of the shunt defect to be closed during its preliminary handling and a final size substantially larger than the diameter of the shunt defect when it is positioned over and across the shunt defect to permanently close it off after being expanded to its larger size, said expansion means comprising at least one um-

brella-like structure for placement on one side of the shunt, said umbrella-like structure having central hub means of at least a generally cylindrical shape for having pressure applied to it along its longitudinal axis for forcing the distal, end portions of the underside of said umbrella-like structure against the septum to at least partially close the shunt, said umbrella-like structure being of a material that will be endothelialized into the septum; the main surface of the umbrella-like structure in its expanded size being at least substantially perpendicular and radial to said central hub means and hence to the central axis of the shunt; and operative means associated with said expansion means for at least temporarily holding said expansion means on to the shunt defect.

3,874,389

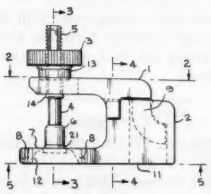
CIRCUMCISION CLAMP

Carl B. Baumgarten, Spring, Tex., assignor to Gomco Surgical Manufacturing Corp., Buffalo, N.Y.

Substitute for Ser. No. 314,736, Dec. 13, 1972, abandoned. This application July 31, 1974, Ser. No. 493,275

Int. Cl. A61b *17/08*

U.S. Cl. 128—346 **7 Claims**



1. A circumcision clamp having an expandable work area comprising,

a lower member having an opening forming a seat, an upper member rotationally mounted on the lower member by means of a tongue attached at one end of said upper member and movably seated in a channel in said lower member for rotating the upper member out of the work area while maintaining the upper member in functional relation with the lower member, said upper and lower members forming a generally C-shaped frame in a closed position and having a slightly elongated configuration for gripping by hand, said upper member having a slot on the opposite end from said tongue,

a clamping ring removably and frictionally engaged in said seat in said opening, said clamping ring having an aperture and recess therein in substantial alinement with said slot, said recess facing away from said upper member,

a rod movably positioned through said slot and said aperture,

a bell-shaped member on one end of said rod, said bell-shaped member having a recess therein adapted to receive the glans of a penis and an outer surface having a diameter greater than the diameter of the opening in said clamping ring, and adapted to receive the prepuce thereover, said bell-shaped member being movable toward and from said recess and aperture in the clamping ring and interfitting with said clamping ring, and,

a nut threaded onto the end of said rod opposite said bell-shaped member for actuating said rod in substantially rectilinear movement.

3,874,390

SMOKABLE PRODUCTS BASED ON CARBONIZED FILLER-CONTAINING CELLULOSE FILMS

Theo Eicher; Friedemann Muller, and Klaus-Werner Krebs, all of Dormagen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 8, 1973, Ser. No. 330,566

Claims priority, application Germany, Feb. 10, 1972, 2206185

Int. Cl. A24b *15/00*

U.S. Cl. 131—2 **10 Claims**

1. A smokable product which comprises a carbonized cellulose-based film which carbonized cellulose-based film contained during carbonization 5 to 50% by weight of at least one inorganic filler selected from the group consisting of a hydroxide, oxide or hydrated oxide of aluminum, iron or silicon, the cellulose of the film being carbonized by heat degradation at temperatures of 150°–300°C and having a degree of degradation of about 5 to 30% by weight and a carbon-to-water molar ratio of about 1:0.8 to 1:1.

3,874,391

METHOD AND MEANS FOR REGULATING THE OPERATION OF APPARATUS FOR THE PRODUCTION AND PROCESSING OF CIGARETTES OR THE LIKE

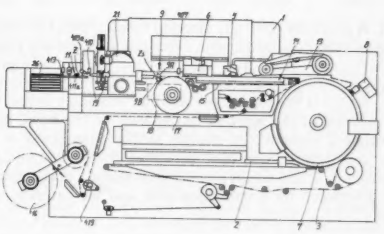
Ernst Dogl; Albrecht Funck, both of Bayreuth; Dieter Wellach, and Hans-Georg Winkler, both of Hamburg, all of Germany, assignors to Hauni-Werke Korber & Co. KG, Hamburg-Bergedorf, Germany

Continuation of Ser. No. 535, Jan. 5, 1970, Pat. No. 3,672,373. This application May 2, 1972, Ser. No. 249,542

Claims priority, application Germany, Jan. 8, 1969, 1900701. The portion of the term of this patent subsequent to June 27, 1989, has been disclaimed.

Int. Cl. A24c *05/34*

U.S. Cl. 131—21 R **17 Claims**



1. In an apparatus for the production and/or processing of cigarettes and/or analogous rod-shaped articles travelling continuously along a predetermined path, a combination comprising a plurality of assemblies adjacent to said path, each of said assemblies being activatable to treat the articles and/or their components; control means for starting and/or terminating the activation of said assemblies; shift register means having a plurality of shifting stages whose number at least equals the number of articles in said path, said shift register means further having a plurality of outputs connecting selected shifting stages with said control means and signal receiving inputs connected with selected shifting stages; means for furnishing pulses to said shifting stages at a frequency corresponding to the number of articles and/or their components which are being produced and/or processed per unit of time; and means for furnishing signals to said inputs whereby such signals are transported with said pulses to successive outputs and to said control means to effect the activation and/or deactivation of said assemblies in a predetermined sequence.

3,874,392
TOBACCO PROCESSING METHOD

Albert W. De Brunn, 51 Diamond St., San Francisco, Calif. 94114, and Gregory R. Feist, 1432 Laguna, Burlingame, Calif. 94010

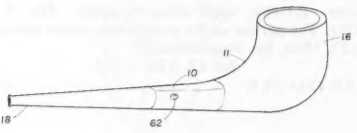
Filed Mar. 4, 1974, Ser. No. 448,085
Int. Cl. A24b *15/02*
U.S. Cl. 131—143 **12 Claims**

1. The method of treating tobacco to remove selected constituents believed to be harmful therefrom which comprises extracting the said constituents from the tobacco by boiling the tobacco in water for a time sufficient to obtain a significant extraction of the said tobacco constituents, drying the tobacco to a point at which it is friable and generally unsuitable for normal cigarette usage, locating the thus dried tobacco in a sealed, air-filled, and water vapor containing container and subjecting the container to a very low temperature in such a way that the moisture in the air surrounding the tobacco is condensed and the tobacco rehydrated to a degree sufficient for use in a cigarette.

3,874,393
COMBINATION TOBACCO PIPE AND SMOKE DILUTION VALVE

Kline D. Strong, 1726 Countryside Dr., Salt Lake City, Utah 84106

Filed Oct. 9, 1973, Ser. No. 404,843
Int. Cl. A24f *01/24, 05/04*
U.S. Cl. 131—193 **12 Claims**



11. A generally vertically directed tobacco pipe bowl having an open upper end and a stem extending substantially perpendicularly therefrom at a base portion thereof comprising means providing a tobacco combustion chamber adjacent said base; means at the base of the bowl for providing access from the exterior of the bowl to the interior of the bowl; means providing a substantially straight smoke passageway in said stem and through said base providing fluid communication therebetween; and means providing an ignition port communicating between the combustion zone and the exterior of the bowl.

3,874,394
BACK ROLL CLEANING APPARATUS AND METHOD

James F. Robertson, 846 Pine Creek Dr., Greenville, S.C. 29605

Filed July 21, 1972, Ser. No. 274,097
Int. Cl. B08f *7/00*; **B05c** *11/00*
U.S. Cl. 134—6 **4 Claims**

1. For use in a web coating apparatus having applicator means for applying a liquid coating material across one side of a web and a rotatable back roll opposide and aligned with said means for applying a liquid coating carrying the other side of said web, a cleaner for said back roll avoiding contamination thereof comprising:

A. a rotatable cleaning roll aligned with said back roll opposite said applicator means;

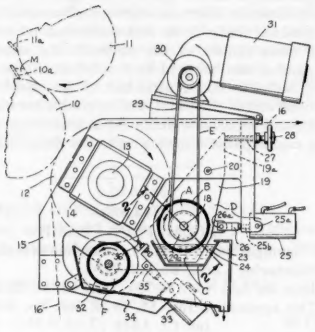
B. a resilient compressible coating over said cleaning roll substantially impervious to said liquid cleaning medium;

C. a fabric sleeve over said resilient coating;

D. means supplying a liquid cleaning medium to said cleaning roll for application thereby to said back roll and for removing contaminants from said resilient covering;

E. means urging said cleaning roll into engagement with said back roll under predetermined pressure sufficient to compress said resilient coating;

F. driving means rotating said cleaning roll with respect to said back roll; and

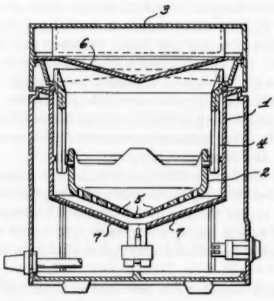


G. means aligned with the back roll and positioned ahead of said applicator means for removing liquid cleaning medium applied to said back roll by said resilient covering; whereby said resilient coating and the sleeve carried thereby expands after engagement with the rotating roll dislodging foreign particles from the sleeve facilitating removal therefrom by said means supplying a liquid cleaning medium.

3,874,395
HANDLING WORKING PIECES IN LIQUIDS IN DENTAL TECHNOLOGY

Hans Lea, Frankfurt, Germany, assignor to Deutsche Gold-und Silber-Scheidean-Stalt Vormals Roessler, Frankfurt/Main, Germany

Division of Ser. No. 291,166, Sept. 22, 1972, Pat. No. 3,793,076. This application Oct. 29, 1973, Ser. No. 410,550
Claims priority, application Germany, Nov. 26, 1971, 2158637
Int. Cl. B08b *3/04*
U.S. Cl. 134—135 **4 Claims**



1. Apparatus suitable for treating workpieces with a liquid, such as the de-oxidizing of dental workpieces with a liquid pickling bath, said apparatus comprising

a first container for containing the liquid,

a second smaller container for supporting the workpieces, cover means operable to be disposed in closing relation to said first container and to be removed therefrom, said cover means including an interior wall having a central

conical portion disposed with its apex extending toward said second container for condensing vapors from the pickling liquid, and

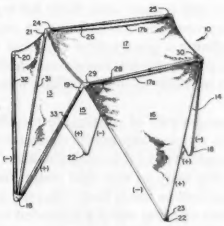
means for connecting said second container to said cover means for movement of said second container with said cover means in supported relation therewith and for swinging movement of said cover means with respect to said second container between an operative position wherein said cover means is disposed in closing relation with said first container and said second container is supported therebelow within the liquid contained in said first container and a drop receiving position wherein said cover means is removed from closing relation with said first container and inverted with respect to its position therein and said second container is supported thereabove.

3,874,396

TENTAGE STRUCTURE

Arthur J. Kirkham, 24 W. Fifth South, Salt Lake City, Utah 84101

Filed Apr. 11, 1973, Ser. No. 350,180
Int. Cl. A45f *1/00*; **E04b** *1/347*
U.S. Cl. 135—1 R **5 Claims**



1. A tent pavilion comprising

a flexible top;

flexible pavilion walls extending from the top, said walls comprising interconnected oppositely spaced side walls and oppositely spaced end walls, each with a pair of edges extending from the top to a remote apex;

means for anchoring the apexes of the side walls to the ground;

means for releasably stretching the roof taut, comprising

a central telescoping ridge pole extending from the center of the connection of one end wall with the top, above the top, and to the center of the connection of the other end wall with the top,

means for releasably securing only the ends of the central ridge pole to the top and end walls,

a pair of telescoping side roof poles, respectively spaced on opposite sides of the central ridge pole, and each extending above and along the connection of the top and a side wall and between the end walls, and

means for releasably securing only the ends of the roof poles to the top and end walls; and

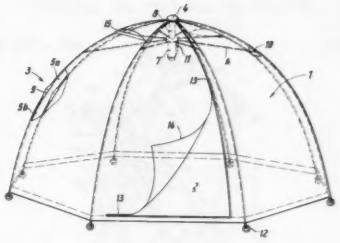
support means for holding the end walls in a generally upright condition.

3,874,397

FOLDABLE TENT

Wilhelm Oberhaus, Osnabruck, Germany, assignor to Heinrich Zangenberg GmbH & Co., Osnabruck, Germany

Filed Aug. 8, 1973, Ser. No. 386,559
Claims priority, application Germany, Aug. 9, 1972, 2239114
Int. Cl. A45f *1/04*
U.S. Cl. 135—2 **6 Claims**



1. A tent having a folding supporting framework and a tent cloth forming a roof portion and a floor portion integral with said roof portion, the supporting framework comprising a central member and stays together with a clamping device for them, the stays leading down to the base corners of the tent and being articulated to the central member, the central member supporting the center of the roof when the tent is erected, the stays having upper and bottom sections, the bottom sections of the stays being foldable outwards to an in-line extended position with respect to the respective upper stay sections, the extended sections of the stays giving the tent a polygonal plan form of substantially hemispherical shape, the two sections of the stays being formed of elastically flexible spring rods of substantially identical length, the bottom sections of the stays at their bottom ends projecting beyond the tent cloth at the bottom corners of the tent in both the erected and folded conditions, the roof portion of the tent cloth being attached to the central member of the supporting framework and also, at its bottom edge and at intermediate points, to the stays, braces between the slide and the upper sections of the stays, and the clamping device comprising a slide which can be vertically displaced relatively to the central member and locked in an upper clamping position in which the stays are deflected outwards by means of said braces between the slide and the upper stay sections, said floor portion is attached to said roof portion, and said floor portion is sewed to the roof portion of the tent cloth at a location spaced from the bottom edge of said roof portion, the section of the floor portion which is spaced from the bottom edge of said roof portion follows the general contour of the roof portion and extends upwardly from the ground surface when the tent is fully erected, the bottom ends of the stays passing to the outside through the tent cloth.

3,874,398

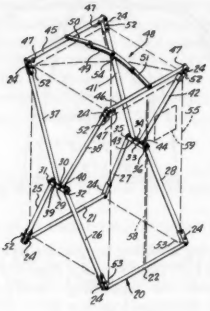
LIGHTWEIGHT PORTABLE ICE FISHING SHELTER FRAME

Richard E. Hendrickson, 1631 E. First St., Duluth, Minn. 55812

Filed June 21, 1973, Ser. No. 371,993
Int. Cl. A45f *1/16*
U.S. Cl. 135—4 R **1 Claim**

1. A lightweight portable ice fishing shelter frame erectable to form a generally rectangular box like frame and foldable into compact form, said frame comprising a pair of closely spaced parallel plates on each side of said frame, a pair of downwardly diverging straight tubular side frame members pivotally secured at one end between said plates on each side of said frame, a pair of upwardly diverging straight tubular

side frame members pivotally secured at one end between said plates on each side of said frame, a hinge secured to each of said side frame members at the end thereof opposite said plates, a pair of spaced parallel tubular straight base frame members each having its opposite ends secured to adjacent hinges on the downwardly diveraging side frame members on opposite sides of said frame, a pair of spaced parallel tubular straight header frame members each having its opposite end secured to adjacent hinges on the upwardly diverging side



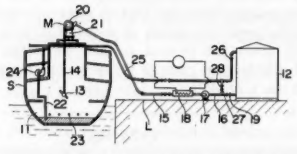
frame members on opposite sides of said frame, a folding brace pivotally connected at its opposite ends centrally to said header frame members, said hinges being semi-tubular in form to permit said frame members to swing to parallel relation to each other, said frame members being foldable so that each of said side frame members, said base frame members and said header frame members extend parallel to each other, and means on said frame for supporting a generally rectangular fishing shelter within said frame.

3,874,399

DELIVERY SYSTEM FOR HIGH MELTING POINT OILS IN A TANK

Koichi Ishihara, Osaka, Japan, assignor to Fuji Oil Company, Limited, Osaka, Japan

Filed June 29, 1973, Ser. No. 374,890
Claims priority, application Japan, July 3, 1972, 47-66541
Int. Cl. B08b *3/10*
U.S. Cl. 137—13 **5 Claims**



3. A method for removing high melting point oils contained in a tank comprising

the step of providing a portion of the same type of oil as is to be removed and which is at such a temperature that it will melt unmelted oil remaining in the tank,

the step of directing said heated oil under pressure onto residual unmelted oil remaining in the tank, whereby the unmelted oil remaining in the tank is melted, and

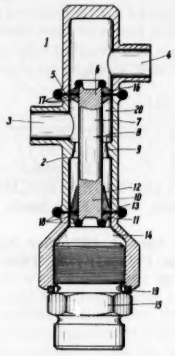
the step of removing melted oil from the tank, and continuously repeating said steps until the unmelted residual oil in the tank is wholly melted and removed from the tank.

3,874,400

QUICK OPENING VALVE OPERATED BY EXPLOSIVE MEANS

Max Groh, Unterpfaffenhofen, Germany, assignor to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany

Filed May 11, 1973, Ser. No. 359,255
Claims priority, application Germany, May 18, 1972, 2224288
Int. Cl. F16k *13/06, 17/40*
U.S. Cl. 137—68 **8 Claims**



1. An explosive actuated valve, comprising:

an elongated and hollow valve body having means defining an inlet opening, means defining an outlet opening and means defining a combustion chamber thereon all communicating with the interior of said hollow valve body;

a piston rod movably mounted in said interior of said valve body;

means defining a pair of rupturable membranes secured to said piston rod and located on opposite sides of said inlet opening and means for securing each of said membranes to said valve body so that said piston rod is held immovably in said hollow valve body whereby a pressure present in said inlet opening will be balanced on said piston rod and on said rupturable membranes; and

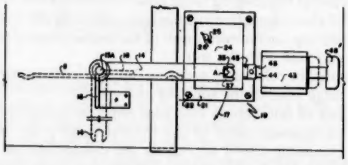
an explosive charge mounted in said combustion chamber at one end of said piston rod, a detonation of said explosive charge offsetting the pressure balance on said piston rod and effecting a rupturing of both of said rupturable membranes and a simultaneous shifting of said piston rod.

3,874,401

DAMPER CONTROLLER

Walter Erwin Karg, 305-188 Colony St., Winnipeg, Manitoba, Canada

Filed Oct. 4, 1973, Ser. No. 403,475
Int. Cl. F16k *17/38;* **F23n** *3/04*
U.S. Cl. 137—77 **17 Claims**



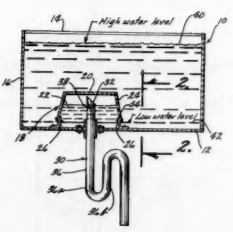
1. A damper controller for ducts and the like which include a hinged damper therein and a rod mounting the damper and extending externally of the duct; said controller comprising in combination a control arm secured to said rod extending from

the duct, and a control assembly mounted adjacent the duct, said control assembly including a casing, a release pin mounted for in and out movement in said casing and detachably engaging the end of said control arm, a fixed fusible link anchor extending from said casing into said duct, a movable fusible link pin also extending from said casing into said duct, a fusible link secured between said anchor and said fusible link pin in the associated duct, said fusible link fusing at a predetermined temperature and being responsive to the temperature of the controlled air in said duct and means operatively connecting said fusible link pin to said release pin whereby said release pin is held engaged with said control arm when said fusible link is in place, and upon fusing of said fusible link said release pin is released for movement in a direction inwardly in said casing to disengage said control arm and release said damper for movement, said means including said fusible link pin being mounted for rotation in said casing, a link pin rotating spring around said link pin reacting between said link pin and said casing, a hinge member mounted by one end thereof in said casing and being operatively secured to said release pin by adjacent the other end of said hinge member, and means operatively connected between said fusible link pin and said hinge member adapted to move said release pin inwardly in said casing when said fusible link pin rotates in one direction.

3,874,402
DOWING SYPHON

Thamon E. Hazen, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed July 26, 1973, Ser. No. 382,651
Int. Cl. F07f *10/02*
U.S. Cl. 137—137 **2 Claims**

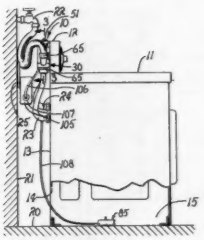


1. In a dosing syphon, comprising,
a water reservoir comprised of a housing having a bottom and side walls,
a bell compartment means in said housing and spaced from said bottom portion, said bell compartment means having a closed upper portion and a lower portion in communication with the interior of said housing for receiving water from the interior of said housing,
a substantially vertical conduit extending from an upper open end within said bell compartment means downwardly and outwardly through said housing,
a trap element in said conduit to capture a quantity of water therein at times,
a water charging opening in communication with the interior of said conduit adjacent said opening in the upper portion of said conduit below the upper end thereof and above the bottom portion of said bell compartment means so that a supply of water will be available to said trap element while the water level rises within said bell compartment, wherein a constant supply of water will be available in said trap element, the improvement comprising a bell compartment air charge opening in said bell compartment means, positioned above the low water level of said syphon,
and means on the upper end of said vertical conduit for substantially eliminating the natural rotational movement of water as it enters said conduit so that a substantially full discharge flow is achieved.

3,874,403
SAFETY ATTACHMENT FOR APPLIANCES SUBJECT TO FLUID LEAKAGE

Wayne L. Fischer, 21197 E. Tollhouse Rd., Clovis, Calif. 93612

Filed Nov. 14, 1973, Ser. No. 415,779
Int. Cl. F16k *17/36*
U.S. Cl. 137—386 **10 Claims**



1. An attachment for an appliance having a fluid inlet conduit, the attachment comprising a fluid shut off valve assembly; means for mounting said valve assembly on the conduit in fluid flow controlling relation thereto; fluid leakage sensing means for placement adjacent to the appliance, said sensing means including a switch resiliently urged to a closed attitude, said switch being maintained in a normally open attitude by a member which is responsive to fluid to allow resilient closure of the switch in the presence of fluid; and power means interconnecting the valve assembly and the sensing means for closing the valve assembly to terminate fluid flow through the conduit upon sensing of the presence of fluid by said sensing means.

3,874,404
CHECK VALVE

William J. Waight, Reseda, Calif.; John A. Williams, Phoenix, Ariz.; Louis C. Garday, deceased, late of Woodland, Calif., and Johnnie A. Garday, legal representative, Somerton, Ariz., assignors to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Apr. 5, 1973, Ser. No. 348,252
Int. Cl. F16k *31/12*
U.S. Cl. 137—493 **9 Claims**

1. A check valve comprising in combination
a housing,
a valve seat in said housing,
an inlet port and an outlet port for said housing,
a poppet valve member slidably mounted in said housing and having a surface engageable with said valve seat,
said surface being exposed to said outlet port upon seating on said valve seat,
a pilot valve assembly slidably mounted in said poppet valve member,
a sensing means cooperatively connected to said pilot valve assembly,
said housing including a chamber, said sensing means being disposed and retained therein and thereby forming first and second cavities in the chamber one to each side of said sensing means,
means for venting the first cavity to the inlet port and the second cavity to the exterior of said housing,

said pilot valve assembly having a pasageway in communication with the cavity vented to said inlet port,

means for defining a fluid flow path between said outlet port and said pilot valve assembly, and

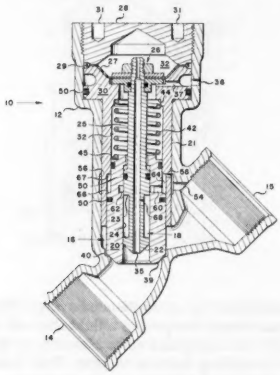
means in said pilot valve assembly for connecting said defining means with said inlet port.

6. In a check valve including inlet and outlet ports, a sensing means in a chamber of the check valve, a poppet valve member having a surface engageable with a valve seat,

the improvement comprising

a portion of said surface being exposed to the outlet port upon the valve seat being engaged,

a pilot valve assembly slidably mounted in said poppet valve member and actuatable by said sensing means,



said pilot valve including a spool portion, a piston portion spaced from said spool portion, and an extension mounted on said piston portion, said sensing means being secured to said extension at an end of said pilot valve opposite said spool portion,

means including a volumetric dimension defining an arrangement of openings between the outlet port and said pilot valve assembly,

said volumetric dimension in cooperative relationship to said poppet valve member, and

means for extending said defining means to the inlet port through said pilot valve assembly.

3,874,405

MULTIPLE TOW-STAGE ELECTROHYDRAULIC SERVOVALVE APPARATUS

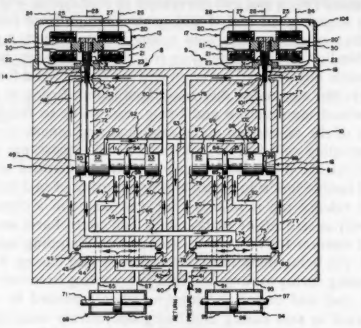
William J. Thayer, Holland, N.Y., assignor to Moog Inc., East Aurora, N.Y.

Filed Aug. 24, 1973, Ser. No. 391,268

Int. Cl. F16k *11/00*

U.S. Cl. 137—596.16 **7 Claims**

1. Multiple two-stage electrohydraulic servovalve apparatus collectively serviceable by a single fluid supply and a single fluid return, comprising at least two servovalves each including first-stage hydraulic amplifier means capable of producing a differential pressure responsive to an electrical command signal and second-stage fluid flow control valve means responsive to said differential pressure, each of said hydraulic amplifier means utilizing input operating fluid and producing output operating fluid, each of said fluid flow control valve means including an actuating port alternately communicable with a pressure metering port and a return metering port determined by the position of a movable valve element arranged to be moved by said differential pressure, the operating fluid for the hydraulic amplifier means of the various servovalves being in series fluid flow communication between said fluid supply and said fluid return, the pressure and return metering ports of the flow control valve means of the various servovalves being operatively connected with said fluid supply and said fluid



return, respectively, and the actuating ports of the flow control valve means of the servovalves being operatively associatable with separate load actuators.

3,874,406

CONTROL VALVE ASSEMBLY

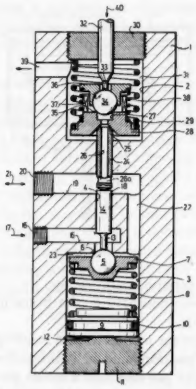
Alexander Von Loewis, Menar, Mauren, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Feb. 28, 1973, Ser. No. 336,889

Claims priority, application Germany, Mar. 7, 1972, 2210776

Int. Cl. F16k *31/02, 11/10*

U.S. Cl. 137—596.17 **9 Claims**



1. A control valve assembly, particularly an electromagnetic valve assembly, comprising a body having a fluid-admitting inlet and a fluid discharging outlet; a first open-and-shut valve mounted in said body to control the outflow of fluid by way of said outlet; a second open-and-shut valve mounted in said body to control admission of fluid by way of said inlet, each of said valves comprising a seat member and a valve member and the latter being movable relative to the seat member between sealing and fluid-admitting positions; a motion transmitting device including a first and a second section arranged end to end, said first section abutting against the seat member of one of said valves and said second section abutting against the valve member of the other of said valves; biasing means including a first spring arranged to urge said seat member of said one valve against said first section and a second spring arranged to urge said valve member of said other valve against

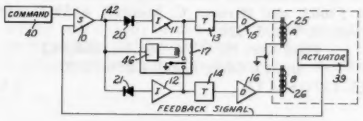
said second section; and actuating means operable to shut said first valve and thereupon open said second valve by way of said first valve and said motion transmitting device.

3,874,407

PULSE WIDTH MODULATION CONTROL FOR VALVES

Ray F. Griswold, 10900 Yolanda Ave., Northridge, Calif. 91324

Filed Jan. 2, 1974, Ser. No. 430,151
Int. Cl. F16k *31/06, 11/10*
U.S. Cl. 137—596.17 14 Claims



1. A control circuit for a fluid controller, including in combination:

first means for generating an error signal;

first and second signal paths, each of said paths including an integrator, a threshold circuit and an output device;

second means for connecting said error signal as an input to each of said integrators, with an integrator output connected to the corresponding threshold circuit which in turn provides an output signal to the output device when the integrator output exceeds the threshold level of the threshold circuit; and

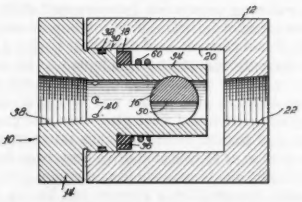
third means for periodically dissipating the integrator outputs.

3,874,408

CONTROL VALVE

Bogdan R. Gryglas, Woodbridge, Ill., assignor to Efdyn Corporation, Chicago, Ill.

Filed Feb. 15, 1974, Ser. No. 442,815
Int. Cl. F16k *11/10*
U.S. Cl. 137—599 3 Claims



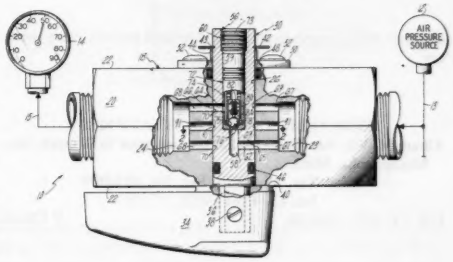
1. A control valve comprising a first body member having a main bore in one end thereof, and an inlet bore in the other end thereof communicating with said main bore; a second body member having a first section seated in said main bore, a second section of reduced cross section projecting into said main bore and defining with said first section a radial wall, an outlet bore therethrough for communication with said main bore, and at least one port communicating with said outlet bore and opening at said radial wall; a cylindrical valve element intersecting said outlet bore and having a cross slot in one side thereof, and said cylindrical valve element being rotatable whereby the position of said cross slot relative to said outlet bore may be selectively adjusted to regulate the flow of fluid from said inlet bore and said main bore through said outlet bore; an axially movable valve element normally engaged against said radial wall closing off said port, and said axially movable valve element being movable away from said radial wall when outlet fluid pressure exceeds inlet fluid pressure whereby said outlet bore is placed in communication with said main bore through said port for equalizing the fluid pressure therebetween; and spring means for normally engaging said axially movable valve element against said radial wall.

3,874,409

SELECTOR VALVE

Leighton Lee, II, Guilford, Conn., assignor to The Lee Company, Westbrook, Conn.

Filed Mar. 29, 1973, Ser. No. 345,984
Int. Cl. F16k *3/22, 15/18*
U.S. Cl. 137—599.2 8 Claims



1. A selector valve comprising a valve body having a valve operating chamber and first and second separate fluid conduit means connected to the valve operating chamber, a valve member shiftable in the operating chamber to first and second separate operating positions thereof, the valve member having passageway means with inlet and outlet means, valve member operating means for selectively shifting said valve member to its said first and second operating positions, and one-way valve means in the passageway means of the valve member for providing unidirectional fluid flow from the inlet means to the outlet means of the valve member, the valve member having in one of its said positions its inlet and outlet means in fluid communication with said first and second conduit means respectively and in its other position its inlet and outlet means in fluid communication with said second and first conduit means respectively whereby unidirectional fluid flow is established through the valve having a direction depending on the operating position of the valve member, the valve member being shiftable to a third separate operating position, and having restricted fluid conduit means providing a restricted fluid connection between the first and second conduit means in said third separate operating position of the valve member, the restricted fluid conduit means comprising a peripheral groove in the valve member having a variable cross-section.

3,874,410

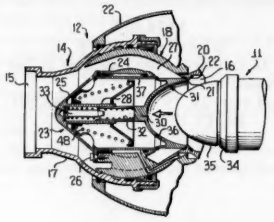
COUPLER VALVE ASSEMBLY

Charles R. Clark, Mission, Calif., assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Aug. 11, 1972, Ser. No. 279,751
Int. Cl. G05d *16/10*
U.S. Cl. 137—614 12 Claims

1. A drogue for use in combination with a pressurized supply line, said drogue comprising a housing, said housing including an inlet and an outlet, said housing having at said outlet means for receiving in internesting relation a probe, a signal valve assembly within said housing, said valve assembly including a first valve member for normally closing said outlet, and a second valve member at said outlet responsive to outlet

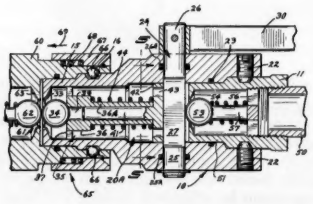
pressure for selectively restricting outgoing flow when said first valve member is in an outletting position, said first valve member being telescoped relative to said second valve member.



3,874,411
HYDRAULIC COUPLER ATTACHMENT

Albam M. Vik, New Brighton, Minn., assignor to Dempco, Inc., Minneapolis, Minn.

Filed Nov. 15, 1973, Ser. No. 416,000
Int. Cl. F16l *29/00, 37/28*
U.S. Cl. 137—614.06 **9 Claims**

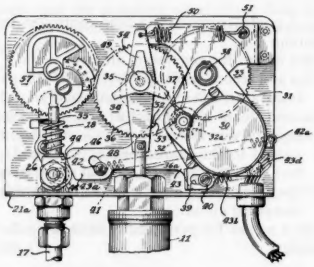


1. In combination with a fluid line check valve coupling assembly including a male nipple a fluid flow control attachment and a female coupling member having a quick release coupling assembly for holding said fluid flow control attachment which receives an end portion of said male nipple said male nipple having a first check valve therein, said first check valve including means extending externally of said male nipple, the improvement comprising said fluid flow control attachment for said male nipple including a body member having a first end forming a female receptacle for said end portion of said male nipple and a second end having an outer surface configured to be substantially identical to the outer surface of said end portion of the male nipple, a bore through said body member, means to attach a first end of said body member to said male nipple, whereby said end portion of said male nipple is seated in said female receptacle, a cam mounted in said body member and movable between a valve open position and a valve closed position, a portion of said cam being of size to engage said means extending externally of said male nipple to move said first check valve to an open position when said body member is attached to said male nipple and said cam is in said valve open position, said first check valve being movable between said open position and a closed position, a second check valve seat defined in said body member, and a second check valve cooperating with said second check valve seat and being operable to check fluid flow in the same direction of flow as that checked by said first check valve, said second check valve and second end of said body being substantially identical to said end portion of said male nipple, and means between said second check valve and said cam to prevent movement of said second check valve away from said check valve seat more than a preselected amount when the cam is in said valve open position holding said first check valve open, and said cam being configured to permit said first check valve to close when the cam is moved to said valve closed position, said second check valve then being permitted to move to position spaced from said valve seat a greater distance than said preselected amount.

3,874,412
TIMING MOTOR DRIVE MECHANISM FOR WATER SOFTENER VALVES

Andrew J. Fleckenstein, 2880 Santa Marin Dr., Brookfield, Wis. 53005, and Herman C. Mitchell, 4159 S. 65th St., Greenfield, Wis. 53220

Filed Apr. 29, 1974, Ser. No. 464,942
Int. Cl. G05g *17/00;* **G05b** *19/00*
U.S. Cl. 137—624.13 **2 Claims**



1. A timing motor timing and actuating mechanism for water softener valves including a water softener valve having a movable control element for controlling various stages of normal softening operation and regeneration in a water softener system, a timing motor adapted to run continuously and a drive gear adapted to be operatively rotated thereby, means providing a driving connection between said drive gear and said control element for translating rotation of said gear into movement of said element, said drive gear having a gap in the periphery thereof, said gap being adapted to be moved into opposition to a drive pinion of said timing motor to prevent engagement between said pinion and said gear, said pinion being adapted to drive said drive gear when said gap is moved away from said pinion, resilient means interconnected with said drive gear so as to bias said drive gear away from a position wherein said gap is opposed to said pinion, and a latching plate movably mounted on a support and having means engageable with said drive gear to hold the gap in said drive gear opposed to said pinion, mechanism for disengaging said latching plate from said gear to allow said resilient means to move said drive gear, said gear and pinion being movably mounted on a support independently of said latching plate, and means biasing said pinion toward an engaged position with said drive gear.

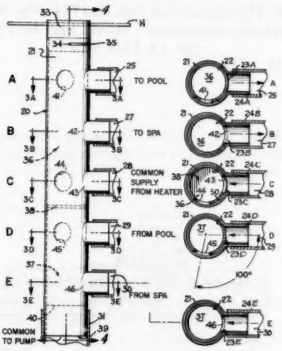
3,874,413
MULTIPORTED VALVE

Carl J. Valdez, San Jose, Calif., assignor to Vals Construction, San Jose, Calif.

Filed Apr. 9, 1973, Ser. No. 348,933
Int. Cl. F16k *11/07*
U.S. Cl. 137—625.47 **7 Claims**

1. A multiported valve of the type having an outer cylindrical casing and an inner cylindrical valve member arranged therein for sealed turning movement for serving either one or the other pool of a dual pool system from a common water reconditioning and recirculating plant; said valve comprising:

1. a partition formed in the inner cylindrical valve member for dividing the latter into a supply zone and a return zone;
2. means on the outer casing for communicating the supply zone of the inner cylindrical valve member with the output side of the common water recirculating plant;
3. means on the outer casing for communicating the return zone of the inner cylindrical valve member with the return side of the common water recirculating plant;
4. a plurality of ports on the outer cylindrical casing including:
   a. a first port radially of said supply zone and communicating with the supply side of one of said pools;
   b. a second port radially of said supply zone and communicating with the supply side of the other one of said pools;
   c. a third port radially of said return zone and communicating with the drain side of said one of said pools; and
   d. a fourth port radially of said return zone and communicating with the drain side of the other one of said pools;
5. said valve member having two sets of ports including:
   a. one set of ports formed therein in planes therealong for registration only with the first and third ports in said outer casing; and
   b. the other set of ports formed therein in offset relation radially to said one set of ports for registration only with the second and fourth ports in said outer casing; and
6. limit means between said inner valve and outer casing for maintaining said two sets of ports in said inner valve member in planes of registration with their respective ports in said casing and for limiting turning movement of said inner valve member relative to said casing a segmental distance comparable to the offset relation of said two sets of ports in said valve member relative to each other for simultaneously changing communication between said dual pools and said water recirculating plant.



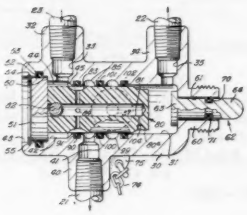
3,874,414

BLOCK AND BLEED VALVE FOR SAFETY SYSTEM

William W. Dollison, Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Nov. 7, 1973, Ser. No. 413,543
Int. Cl. F16k *17/00*
U.S. Cl. 137—625.66 **6 Claims**

1. A valve device for selectively communicating a first port with second and third ports in one mode of valve operation and for communicating the second and the third ports with a fourth port blocking the first port in a second mode of valve operation, said device comprising: a housing having a valve chamber therein, said housing having first, second, third and fourth ports communicating with said valve chamber; a valve member disposed in slidable relation in said valve chamber for movement between a first position at which said valve is in said first operation mode and a second position at which said valve is in said first operation mode and a second position at which said valve is in said second operation mode; said housing and said valve member being provided with passage means



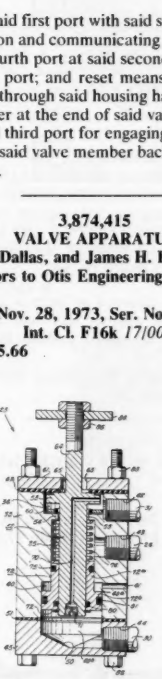
communicating said first port with said second and third ports at said first position and communicating said second and third ports with said fourth port at said second position while shutting off said first port; and reset means comprising a piston slidably disposed through said housing having a piston head in said valve chamber at the end of said valve chamber communicating with said third port for engaging an end of said valve member to move said valve member back from said second to said first position.

3,874,415

VALVE APPARATUS

Phillip E. Pierce, Dallas, and James H. Bostock, Denton, both of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Filed Nov. 28, 1973, Ser. No. 419,668
Int. Cl. F16k *17/00*
U.S. Cl. 137—625.66 **20 Claims**



1. A valve device comprising: a body having a bore divided into first, second and third chambers; means providing a first port leading to said first chamber; means providing a second port leading to said first chamber; means providing a third port leading to said second chamber; means providing a fourth port leading to said third chamber; means providing a flow passage between said first and second chambers; means providing a valve seat around said flow passage between said first and second chambers; a valve stem in said body bore provided

with a valve member disposed in said first chamber and movable between a first position closing said first port from said first chamber while opening said passage between said first and second chambers and a second position opening said first port and closing said passage between said first and second chambers; means providing a passage between said first and third chambers; and operator piston means on said stem for moving said stem and valve member between said first and second positions responsive to a pressure differential across said piston, said piston having a first portion movable in said second chamber responsive to pressure in said second chamber, and said piston having a second larger portion movable in said third chamber responsive to said pressure in said third chamber.

3,874,416

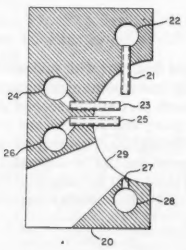
LIQUID FLUIDIC DEVICE

Sander B. Friedman, 8117 Parkside Ave., Morton Grove, Ill. 60053, and Hugh R. Martin, 110 Shea Crescent, Kitchener, Ontario, Canada

Filed Mar. 4, 1974, Ser. No. 447,665

Int. Cl. F15c *1/18*

U.S. Cl. 137—836 **14 Claims**



1. A liquid fluid operated control device comprising:
a. an emitter nozzle for coupling to a liquid supply source and operative to issue a coherent and laminar liquid emitter jet;
b. a control nozzle adapted to issue a liquid control jet having a Reynolds number less than **550** operative to deflect the emitter jet inward towards the control nozzle; and
c. receiver means spaced downstream from the emitter for receiving the emitter jet.

3,874,417

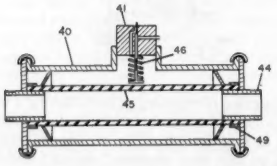
PNEUMATIC PUMP SURGE CHAMBER

Robert B. Clay, 728 W. 3800 S. Bountiful, Salt Lake City, Utah 84119

Filed May 24, 1973, Ser. No. 363,684

Int. Cl. F16i *55/04*; **F04b** *11/00*

U.S. Cl. 138—30 **1 Claim**



1. A surge chamber of limited volume expansion for accomodating pressure surges of wide ranges and relatively high pressure surges incident to pumping fluids on a first in/first out basis so that no accumulation of the pumped fluid occurs comprising, in combination, an elastic expandable tube adapted to be connected to a delivery flow line and adapted to receive a mass of said fluid from a pump or variable pressure source; a rigid gas-tight chamber circumscribing said tube and spaced from said tube; a pressurized gas source for supplying gas under pressure to said chamber; and a three-way valve connecting said gas source and said chamber directly activated by expansion and subsequent elastic contraction of said tube to respectively allow the pressurized gas to enter and leave and thus respectively pressurize and depressurize said chamber thereby dampening expansions of said tube as caused by pressure surges of a pumped fluid within said tube.

3,874,418

PIPE COATING

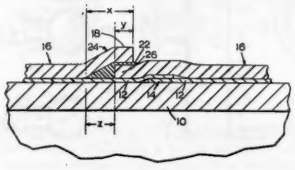
Ralph Hielema, Locust Hill, Ontario, Canada, assignor to The Kendall Company, Chicago, Ill.

Continuation of Ser. No. 243,705, April 13, 1972, abandoned, which is a division of Ser. No. 54,489, July 13, 1970, Pat. No. 3,700,520. This application Jan. 7, 1974, Ser. No. 431,249

Claims priority, application Canada, Apr. 16, 1970, 080271

Int. Cl. F16l *9/14*

U.S. Cl. 138—144 **2 Claims**

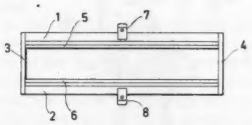


1. A protective coated pipe comprising:
a. a conduit;
b. a corrosion protective inner adhesive coated plastic tape progressively wound onto and adhesively secured to the entire outer surface of said conduit and having a marginal overlap at each adjacent turn;
c. a mechanical protective film of plastic material progressively wound with a predetermined wrapping tension over said corrosion protective tape with a trailing marginal edge portion of a subsequent lap overlapping a portion of the leading edge of an earlier lap, to form a marginal overlap whereby a wedge-shaped region is formed lying between the outer surface of said corrosion protective tape and a portion of said subsequent lap of said mechanical protective film, said wedge-shaped region being spaced axially ahead of said leading edge of said earlier mechanical protective film lap;
d. means for bonding said subsequent lap directly to said corrosion protective tape in said wedge-shaped region and to said earlier lap in the area of said marginal overlap; and
e. said bonding means including a hot melt thermoplastic adhesive compatible with said tape and film, said hot melt adhesive substantially being applied to the region of said marginal edge portion only in sufficient quantity and width to form a unitary fused mass between said overlapping portions of said mechanical protective film and between said subsequent lap and said underlying corrosion protective tape.

3,874,419
GUIDING ATTACHMENT FOR HEDDLE SUPPORTING SHAFT

Theodor Wagner, Heppstr. 149, 7411 Reutlingen-Betzingen, Germany

Filed Feb. 28, 1974, Ser. No. 447,008
Claims priority, application Germany, Mar. 8, 1973, 7308737[U]
Int. Cl. D03c *9/06*
U.S. Cl. 139—91 10 Claims

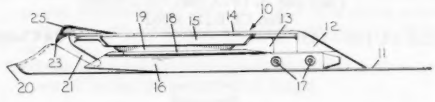


1. A multi-part guiding attachment for heddle supporting shafts of looms comprising a first part rigidly connected to the shaft, and a second part detachably connected to such first part.

3,874,420
WEFT INSERTING CARRIER

John A. Cugini, Hopedale, Mass., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Oct. 23, 1973, Ser. No. 408,293
Int. Cl. D03d *47/18*
U.S. Cl. 139—122 N 1 Claim



1. A weft inserting carrier for shuttleless looms for inserting single picks of weft into separate sheds of warp threads selectively drawn from any one of a plurality of independent sources of weft supply, comprising:

a. a base portion having a rear sidewall protruding therefrom with a flat top surface connected to and extending forwardly from said rear sidewall;

b. guide means in said rear sidewall for receiving and guiding a selected weft thread as it is inserted into a warp shed;

c. a combined weft trapping and guide member extending forwardly and outwardly from said top surface, said member including

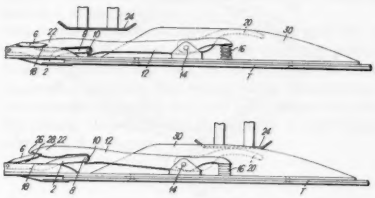
1. a downwardly directed hooked portion located adjacent the upper end of said guide means and spaced laterally outwardly therefrom; and also including

2. a portion that is flared upwardly and rearwardly from said hooked portion to define a camming surface that will move a weft yarn that misses the entrance into the guide means, drawn past said hooked portion, into said guide means.

3,874,421
CARRIER FOR WEFT INSERTION

William Denis Grenville Mackie, Templepatrick, Northern Ireland, assignor to James Mackie & Sons Limited, Belfast, Northern Ireland

Filed Dec. 6, 1973, Ser. No. 422,505
Claims priority, application United Kingdom, Dec. 14, 1972, 57821/72
Int. Cl. D03D *47/20*
U.S. Cl. 139—122 N 7 Claims

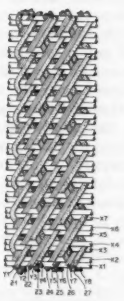


1. A weft inserter or spear for a shuttleless loom the inserter having a hook mounted on its leading end to engage weft thread wherein a warp deflector means is provided moveable between one position in which it enables weft yarn lying in the path of the hook to be engaged by the hook and another position in which said warp deflector means acts to deflect warp yarn from the hook on withdrawal of the inserters from the shed of the loom.

3,874,422
TRIAXIALLY WOVEN FABRICS OF UNIFORM COMPLIANCY AND POROSITY

Norris F. Dow, Radnor, Pa., assignor to N.F. Doweave, Inc., Philadelphia, Pa.

Filed Mar. 13, 1974, Ser. No. 450,735
Int. Cl. D03d *13/00*
U.S. Cl. 139—383 R 10 Claims

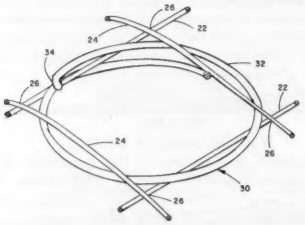


1. In a triaxially woven fabric comprising three sets of parallel yarn courses, the yarn courses of each set forming an angle of approximately 60° with the intersecting yarn courses of each other set, the improvement consisting of a repetitive weave pattern with relatively uniform porosity said pattern including unstabilized lengths of yarn courses in each yarn course set, said unstabilized lengths in each yarn course set crossing at least two intersecting yarn courses of one of the remaining yarn course sets, said unstabilized lengths providing some compliancy to the fabric, said compliancy being relatively isotropic in the plane of the fabric.

3,874,423
SPRING BASE AND METHOD OF FORMING SAME

Sam Larkin, Belle Harbor, N.Y., assignor to Spring Associates, Inc., Brooklyn, N.Y.

Division of Ser. No. 214,773, Jan. 3, 1972, Pat. No. 3,777,322.
This application July 12, 1973, Ser. No. 378,602
Int. Cl. B21f *15/08, 27/10, 27/16*
U.S. Cl. 140—3 CA 2 Claims



1. A method of forming a spring base comprising the steps of:

securing a plurality of first rod-like members in a spaced-apart, longitudinally extending arrangement;

forming one end of each spring of a plurality of springs with a closed loop of greater lateral extent than the spacing between associated members of said first rod-like members;

abutting upper portions of each closed loop against under surfaces of said associated members of said first rod-like members;

abutting upper surfaces of a plurality of second rod-like members against lower portions of each closed loop with said second rod-like members being placed in a spaced-apart, transversely extending arrangement where said closed loop of each of said springs is of greater lateral extent than the spacing between associated members of said second rod-like members;

positioning portions of said upper surfaces of said associated members of said second rod-like members against portions of said under surfaces of said associated members of said first rod-like members to define an intersecting grid-like array with said springs being operatively associated with respective openings in said grid-like array, said respective openings each being defined by a respective pair of said associated members of said first rod-like members and a respective pair of said associated members of said second rod-like members; and

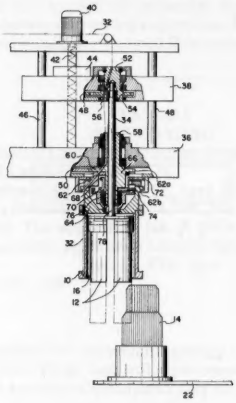
securing each of said portions of said first and second rod-like members to one another respectively at mutually intersecting positions for biasing said first rod-like members against said upper portions of each closed loop in one direction and for biasing said second rod-like members against said lower portions of each closed loop in an opposite direction to monolithically wedge and restrain said closed loops of said springs against dislodgement from being sandwiched between said first and second rod-like members.

3,874,424
ARRANGEMENT FOR WINDING OF COILS INSERTABLE INTO STATORS OF ELECTRIC MACHINES

Willi Muskulus, Bergen-Enkheim, Germany, assignor to Balzer & Droll KG, Niederdorfelden, Germany

Filed July 30, 1973, Ser. No. 383,469
Claims priority, application Germany, July 29, 1972, 2237384
Int. Cl. B21f *3/04*
U.S. Cl. 140—92.1 13 Claims

1. In apparatus for the winding of wire coils which can be drawn axially into a stator of an electric machine, having a templet onto which the coil wire can be wound and from which the wound coils can be stripped, a rotatable wire-guiding device for winding wire in coil form onto said templet, and a transfer tool relatively movable axially into said templet and onto which the wound coils can be stripped from the templet, the improvement comprising means for effecting relative movement of said wire guiding device continuously in a direction axially away from said transfer tool relative to said

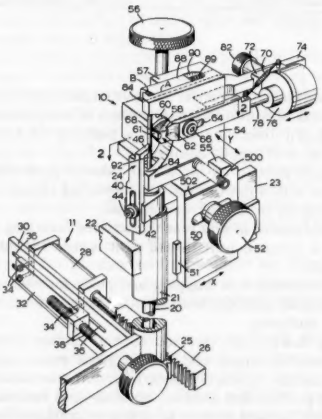


templet and relative movement of said transfer tool continuously axially toward and into said template during winding movement of said wire guiding device, and hence during the whole winding process of a coil, said templet having an axially extending untapered surface portion onto which the wire coming from said wire-guiding device is placed such that all the turns of a coil are accumulated on the templet before removal from it.

3,874,425
WIRE BENDER

Arthur William Edward Guenther, 2400 St. Frances Dr., Burlington, Ontario, Canada

Filed July 3, 1973, Ser. No. 376,182
Int. Cl. B21f *35/02*
U.S. Cl. 140—103 24 Claims



1. A method of bending a straight wire to form a hook, comprising:

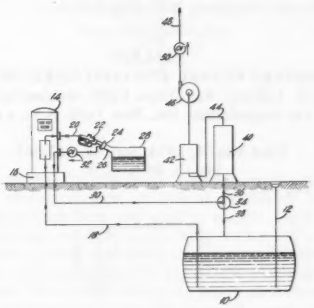
positioning the wire in a predetermined axis;
moving an arbor into lateral contact with the wire, and moving a first bending head into a position laterally of the free end portion of the wire projecting beyond the arbor; moving the first bending head laterally against the free end portion of the wire projecting beyond the arbor to bend the wire about the arbor;
withdrawing the arbor longitudinally from the formed hook and from the vicinity of the hook;
withdrawing the first bending head laterally from the vicinity of the arbor;
moving a second bending head into a position laterally of the free end portion of the wire and unobstructive of the movement of the wire bent about the arbor by the first bending head;
subsequent to the movement of the first bending head, moving the second bending head laterally against the free end position of the wire projecting beyond the arbor and in a direction transverse to the direction of movement of the first head, the second head being moved (1) past the arbor in a direction parallel to the straight portion of the wire and then (2) in a direction towards the straight portion of the wire whereby the free end of the wire moves through an arc greater than 180°; and
withdrawing the second bending head from the vicinity of the arbor.

3,874,426
CAN-FILLING METHOD FOR MEAT-CANNING PROCESS
Henry M. Ross, The Lawn Rt.2, Nokesville, Va. 22123
Filed Apr. 17, 1973, Ser. No. 352,071
Int. Cl. B65b *1/46*
U.S. Cl. 141—11 **2 Claims**

1. A method for filling containers with precise weights of a non-uniform material comprising the steps of
a. Adding a first predetermined amount of said material to produce a coarse fill under the desired final weight.
b. Weighing the container and contents to determine preliminary weight shortage error,
c. Preparing a fine mixture of said material,
d. Extruding said material in a form having a substantially uniform predetermined weight per unit length,
e. Measuring a length of extruded material to constitute a second predetermined amount of said material to compensate exactly for the preliminary weight shortage error, and
f. Adding said second predetermined amount to produce an exact fill having the desired final weight.

3,874,427
FUEL VAPOR RECOVERY SYSTEM
Donald David Tiggelbeck, Pittsburgh, Pa., assignor to Calgon Corporation, Pittsburgh, Pa.
Filed Mar. 20, 1974, Ser. No. 452,891
Int. Cl. B65b *31/00*
U.S. Cl. 141—52 **8 Claims**

1. A fuel vapor recovery system comprising in combination:
a bulk fuel storage tank;
a fuel delivery conduit communicating at one end with liquid fuel in said bulk fuel storage tank and communicating at the other end with one end of a flexible fuel delivery hose;
a fuel delivery nozzle affixed to the opposite end of said fuel delivery hose, said fuel delivery nozzle having sealing means adapted to form a substantially vapor-tight or vapor-limiting connection between said fuel delivery nozzle and a filling spout of an automotive fuel tank;
a vapor return conduit communicating at one end through said sealing means with said automotive vehicle fuel tank; a normally closed valve means mounted in or controlling said one end of said vapor return conduit, said valve means being adapted to switch to the open position only when fuel is being delivered through said fuel delivery nozzle to said automotive vehicle fuel tank;
a three-way valve means mounted on the opposite end of said vapor return conduit adapted to divide said vapor return conduit alternatively into first and second branches;
a conduit including plenum means constituting said first vapor return branch communicating at one end with said three-way valve means and at the other end with means for adsorbing fuel vapors, said means for adsorbing fuel vapors comprising a canister of adsorptive material and having a discharge side;
a vent conduit communicating at one end with the atmosphere and at the other end with the discharge side of said means for adsorbing fuel vapors adapted to vent said means for adsorbing fuel vapors to the atmosphere, said vent conduit including one-way valve means for preventing reverse flow from the atmosphere to said means for adsorbing fuel vapors;

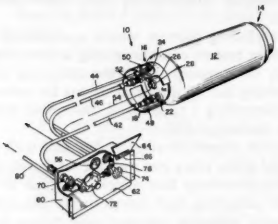


a pump means in said vent conduit below said one-way valve means for creating a vacuum in said first vapor return branch whereby fuel vapors are pulled from said automotive vehicle fuel tank through said means for adsorbing fuel vapors when said normally closed valve means in said vapor return conduit is in the open position; and
a conduit constituting said second vapor return branch connecting said three-way valve means with the upper portion of said bulk fuel storage tank whereby said bulk fuel tank may be connected through said three-way valve means to said vapor return conduit when a vacuum condition has been created in said bulk fuel storage tank due to the emptying thereof, thereby pulling fuel vapors from said automotive vehicle fuel tank into said bulk fuel storage tank when said normally closed valve means in said vapor return conduit is in the open position.

3,874,428
REMOTE FILL SYSTEM FOR L-P GAS CYLINDER
Charles R. Golay, Cambridge City, Ind. 47327
Filed Aug. 8, 1973, Ser. No. 386,780
Int. Cl. B65b *3/04*
U.S. Cl. 141—95 **1 Claim**

1. A fuel source comprising an L-P gas tank providing a filler valve fitting, a vent valve fitting, and a service valve fitting, and, in combination with said tank, a fill system comprising a service box remotely located from said tank, a filler valve disposed in said box, first elongated conduit means for connecting said filler valve to said filler valve fitting, a sight valve disposed in said box, second elongated conduit means for connecting said sight valve to said vent valve fitting, whereby said tank can be filled through said filler valve to the proper level by observing said sight valve and stopping the gas flow to said filler valve when gas appears at said sight valve,

a pressure regulator valve disposed in said box, third elongated conduit means for connecting said regulator valve to said service valve fitting, said tank being provided with a



volumetric indicating device, and an electrically-operated visual sight gage disposed in said box and electrically connected to said volumetric indicating device.

3,874,429

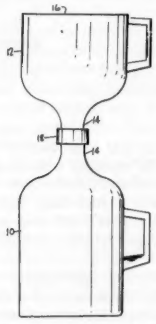
COMBINED FUNNEL AND CONTAINER DEVICE

Kenneth K. LaFarge, San Diego, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Mar. 4, 1974, Ser. No. 447,567

Int. Cl. B67c *11/00*

U.S. Cl. 141—98 **2 Claims**



1. A combined funnel and container device comprising:

first and second like hollow plastic bottles, each having, at one end, a reduced diameter open neck with external threads, the other end of one bottle being cut away, the other bottle being disposed in vertical upright position, the one bottle being disposed in vertical inverted position with its inverted neck extending above and abutting the upright neck of said other bottle; and

a manually operable connecter sleeve detachably securing said abutting necks together in a leak proof manner.

3,874,430

FILLING DEVICES

Alan Lansdale, Bolton, England, assignor to Mather & Platt Limited, Manchester, England

Filed Apr. 4, 1973, Ser. No. 347,763

Claims priority, application United Kingdom, Apr. 5, 1972, 15675/72

Int. Cl. B65b *3/04*; **B05d** *1/28*

U.S. Cl. 141—116 **11 Claims**

1. A container filling device comprising:

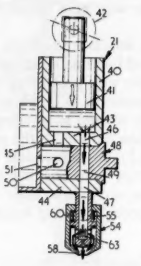
a. a chamber having a liquid inlet and a liquid outlet,

b. a piston reciprocable within the chamber to suck liquid into the chamber in one direction of piston movemen. and to expel liquid from the chamber in the opposite direction of piston movement, and

c. a nozzle assembly in communication with the chamber outlet, and comprising:

i. an inner tubular member in communication with the chamber outlet, said member having an outlet end formed with a capillary passage, and aperture means for liquid egress upstream of the capillary passage,

ii. an outer tubular member coaxial with the inner tubular member and axially movable away therefrom under liquid pressure produced by the movement of the piston in said opposite direction, and



iii. resilient means between the inner and outer tubular members for urging the outer tubular member axially towards the inner tubular member to a position whereat it cooperates with the inner tubular member to seal off liquid flow from the aperture means, whereby when the piston reverses its stroke from said opposite direction to said one direction the liquid pressure ceases, the resilient means causes liquid flow from the aperture means to be sealed off, and any liquid remaining at the outlet end of the inner tubular member is thereafter sucked in through the capillary passage to prevent dripping.

3,874,431

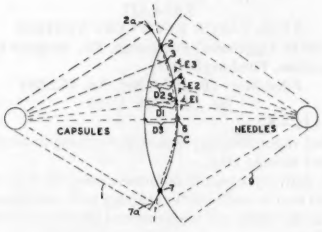
POWDER FILLING MEANS

Theodore F. Aronson, Glen Cove, N.Y., assignor to Perry Industries, Inc., Hicksville, N.Y.

Filed Apr. 3, 1969, Ser. No. 813,022

Int. Cl. B65b *43/50*

U.S. Cl. 141—129 **11 Claims**



1. In a machine filling powder into capsules,

a first turret rotatably mounted and adapted to carry capsule bodies along its periphery,

a second turret rotatably mounted and adapted to carry powder filler needle assemblies spaced along its periphery,

said first and second turrets being arranged to rotate continuously in a generally overlapping intermeshing tangential relation,

a plurality of radial slides mounted on said filler needle assembly carrying second turret, one of said filler needle assemblies being mounted on each of said slides,

means to cam said slides radially to substantially follow the circular motion of said capsule bodies mounted on said first turret for a predetermined distance before and after the central point of tangency of the first and second turrets,

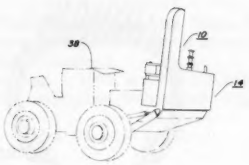
whereby said needles are in position to fill said capsule bodies for a pre-determined distance before and after a central point of tangency during continuous motion of said turrets.

3,874,432

TREE HARVESTING APPARATUS

Alva Z. Albright, Pineville, La., assignor to Al Albright, Inc., Pineville, La.

Filed June 12, 1973, Ser. No. 369,363
Int. Cl. A01g *23/08*; **B27b** *17/02*
U.S. Cl. 144—34 R **3 Claims**



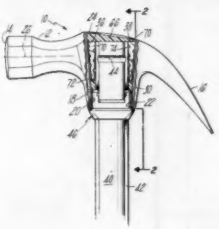
1. Improved tree harvesting apparatus for use with a power train having an auxiliary power supply, said apparatus having a hollow anvil with a rectangular base and a projection adjacent a side thereof which extends normal to said base in a common horizontal plane, the angle therebetween being defined by open sides, and said apparatus comprising: a modified rectangular saw bar, having oppositely disposed leading and back edges and opposite ends, pivotally mounted in said base by a pivot defined adjacent said leading edge and one of said opposite ends, for pivoting in said common horizontal plane from wholly within said base to partially into said projection through said open sides and the right angle therebetween, said saw bar defining at the other of said opposite ends a stop and lock extending normal to said leading edge and conformed in shape to a free end of the projection for limiting movement of said saw bar therein, said saw bar also having a wedge fixed on the back edge thereof and parallel to said leading edge for providing a wedging action therewith; a chain saw mounted for rotation around said saw bar with a cutting run on the leading edge thereof as it pivots from said base into said projection; pusher means pivotally mounted on said base adjacent intersection with said projection for pivoting from a parallel position therewith to an upright positionadjacent said projection to thereby bias a tree positioned between said base and projection toward said projection; actuating means operatively connected to said auxiliary power supply and mounted respectively adjacent said saw bar, pusher means and chain saw for respectively pivoting said saw bar, pusher means and rotating said chain saw aroind the saw bar; and power control means mounted in said power train and on said hollow anvil and connected between said auxiliary power supply and the actuating means for the coordinated application of the power supply to said actuating means to fell trees.

3,874,433

HAND TOOL CONNECTION AND TRIM COLLAR THEREFOR

Warren Arnold Shepherd, Jr., Warren Township, Hartford County; Paul Allison Ketchpel, Jr., Simsbury; Edward John Johnson, and Frank George Biondi, both of New Britain, all of Conn., assignors to The Stanley Works, New Britain, Conn.

Filed Sept. 12, 1973, Ser. No. 396,523
Int. Cl. B25d *1/00*
U.S. Cl. 145—29 R **9 Claims**



1. A hand tool for percussive use comprising a tool head having a striking surface, an axis of percussion extending through said head from said striking surface and a handle-receiving eye spaced from said striking surface and extending entirely through said head along an axis normal to the axis of percussion, said eye having an entrance end and an outer end; a reinforced fiber handle having a portion positioned within the eye a sufficient distance to intersect said axis of percussion and extending outwardly from the entrance end of the eye, said handle portion being free of direct contact with the tool head to provide an annular space extending fully around the handle and axially along the handle between the handle portion and the tool head; a preformed annular trim collar sealably interconnecting the handle and the tool head at the entrance end of the eye comprised of an exposed trim portion and a concealed plug portion having substantially the same cross-sectional dimension as the annular space and being disposed within the space to effectively seal the space at the entrance end of the eye, said plug portion being of sufficient length to facilitate initial handle alignment and retention in said alignment upon mounting in said eye yet of an insufficient length to extend through the axis of percussion and being held in position by a force fit interconnection with the tool head within the eye, said trim portion including an outwardly projecting shoulder for engaging the tool head adjacent the periphery of the eye at the entrance end thereof and a tapered exterior trim surface extending from the shoulder toward the handle; and an impact resistant resin disposed within said annular space at said axis or percussion for bondably joining said head, said handle and said trim collar.

3,874,434

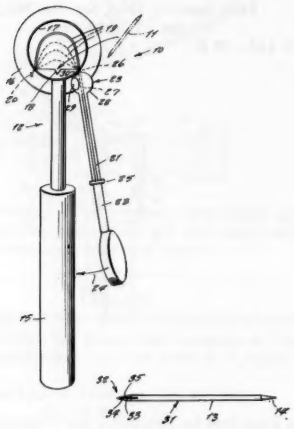
TWO POINTED NAIL AND HOLDER

Robert E. McFeeley, 231 Barlow Ave., Staten Island, N.Y. 10308

Filed Jan. 30, 1974, Ser. No. 437,849
Int. Cl. B25d *1/04*; **F16b** *15/04*
U.S. Cl. 145—30 R **3 Claims**

1. In a two-pointed nail and holder set, the combination of a double-ended nail and a holder having means to grasp said nail about its middle while said nail is being driven at one end into an object; said nail comprising an elongated metal shank which is tapered at each end to a point at least one of said

pointed ends having an off-center longitudinal split groove, thus forming a pair of split tips one of which is longer and

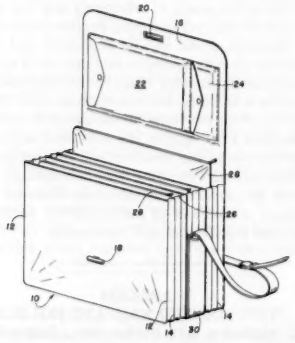


thicker than the other split tip in order that they spread apart at different rates while being driven.

3,874,435
FEMALE BUSINESS CASE

Lelia M. Allen, Pittsburgh, Pa., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Aug. 31, 1973, Ser. No. 393,400
Int. Cl. A45c *3/02*
U.S. Cl. 150—1.6 **1 Claim**



1. A female business case comprising:

a flexible hollow vertical purse like member open at the top with a top flap for removably closing the top opening, said member having vertical outer sides with vertical folds permitting the member to be compressed or expanded between front and rear vertical surfaces;

means secured to the inside surface of said top flap for removably storing tablets and pens;

vertical partitions disposed in the interior of said member to divide the interior of said member into a plurality of vertical compartments;

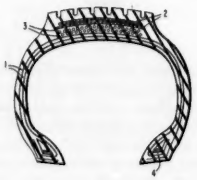
at least one switch out folder removably disposed in a corresponding compartment, said folder being a flexible, hollow, narrow container adapted to hold papers and the like and having a zippered opening; and

an adjustable carrying strap secured to the outside of the member, said strap being wide at the base of the chamber and decreasing in width as the strap extends toward the top of the purse member.

3,874,436
RADIAL-PLY TIRE WITH STEEL AND TEXTILE BREAKER

Taizo Hashida, Nishinomiya; Shoji Miyoshi, Osaka; Hiroyasu Fujishima, Osaka, and Masaru Okumura, Osaka, all of Japan, assignors to Toyo Rubber Industry Co., Ltd., Osaka-shi, Osaka, Japan

Filed July 24, 1972, Ser. No. 274,386
Claims priority, application Japan, July 23, 1971, 46-55069; Aug. 10, 1971, 46-60875
Int. Cl. B60c *9/16*
U.S. Cl. 152—361 DM **3 Claims**



1. A radial-ply tire comprising a carcass, a tread and a breaker layer, said breaker layer consisting of four rubberized cord layers comprising two separate outside cord layers composed of textile fiber cords and two inside cord layers composed of steel cords, the same kinds of cords crossing each other, said textile fiber cords having an angle of inclination of 10° to 20° with respect to the equatorial line of said tire and said steel cords having an angle of inclination of 15° to 25° with respect to said equatorial line, said steel cords sharing 40 to 65 percent of the entire strength of said breaker layer, the angle of inclination of said steel cords with respect to said equatorial line being at least 5° larger than the angle of inclination of said textile fiber cords with respect to said equatorial line, wherein the rubber for embedding said textile fiber cords has a 100 percent modulus of 40 to 50 Kg/cm² and the rubber for embedding said steel cords has a 100 percent modulus different from the 100 percent modulus of said rubber for embedding said textile fiber cords and is of 50 to 70 Kg/cm².

3,874,437
WINDSHIELD COVER

Sidney L. Black, 1823 Sherry Ln., Route 2, Edmond, Okla. 73034

Filed Nov. 5, 1973, Ser. No. 413,283
Int. Cl. B60j *1/20*
U.S. Cl. 160—368 S **4 Claims**

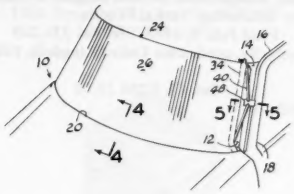
1. A protective cover for a windshield of a vehicle, comprising:

a generally rectangular panel of flexible sheet material adapted for positioning in overlying relation on the windshield of the vehicle and when so positioned defining top, bottom and end edge portions,

said panel being provided with loop forming hems near its bottom and end edge portions;

an elongated strip of buoyant pliable material having a transverse cross-section area of at least 2 square inches

within and coextensive with the bottom hem for forming a wind resistant panel stiffener;



a stretcher rod within each said end edge hem; and,

flexible means connected with the respective end portions of each said stretcher rod for securing said panel to adjacent side portions of the vehicle.

3,874,438

APPARATUS FOR THE CONTINUOUS CASTING OR DRAWING OF AN EXTRUSION BODY THROUGH A COOLANT BODY

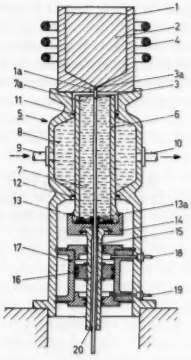
Keith Phillips, Niederrohrdorf, and Peter Sahm, Nussbaumen, both of Switzerland, assignors to Brown Boveri & Company Limited, Baden, Switzerland

Filed Aug. 7, 1972, Ser. No. 278,383

Claims priority, application Switzerland, Aug. 30, 1971, 12600/71

Int. Cl. B22d *11/12*

U.S. Cl. 164—283 S **2 Claims**



1. Apparatus for the continuous casting or drawing of a tubular extrusion body from a molten mass, which comprises a crucible for holding such molten mass, said crucible having a bottom outlet,

a cooling device provided next to the outlet of the crucible through which such extrusion body runs, said cooling device comprising a cooling bath positioned in a container, with such extrusion body immersing into the level of the bath, and

means for adjusting the distance between the crucible outlet and the cooling bath level which means are arranged beyond the solidification front of such extrusion body emerging from the molten mass,

there being provided within such tubular extrusion body a column of cooling liquid and a filling of pressure gas which loads this column counter to the running direction of such extrusion body.

3,874,439

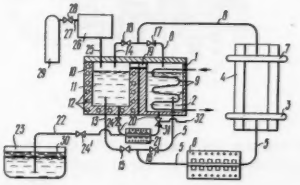
DEVICE FOR COOLING THE CRYSTALLIZER IN A PLANT FOR CASTING METAL INGOTS WITH A PERIODIC DISCHARGE THEREOF

Evgeny Alexeevich Korshunov, pereulok Otdelny, 5a, kv. 29; Jury Avramovich Samoilovich, ulitsa Engelsa, 27, kv. 26; Valery Pavlovich Kostrov, ulitsa Bazhova, 57, kv. 10; Oleg Ashotovich Aragilian, ulitsa Kuibysheva, 137, kv. 3; Vladimir Alexeevich Goryainov, ulitsa Malysheva, 82, kv. 2, and Anatoly Grigorievich Tarasov, ulitsa Lunacharskogo, 76, kv. 75, all of Sverdlovsk, U.S.S.R.

Filed Oct. 2, 1974, Ser. No. 429,830

Int. Cl. B22d *11/14*; **F28d** *15/00*

U.S. Cl. 164—283 M **3 Claims**



1. A device for cooling the crystallizer in a plant for casting metal ingots with a periodic discharge thereof, comprising: a coolant storage; a vessel for low-temperature coolant connected by pipeline to said storage; an arrangement for reducing the coolant temperature built in into said vessel for low-temperature coolant; an inflow pipeline connecting said crystallizer being cooled to said vessel for low-temperature coolant; an outflow pipeline connecting said crystallizer being cooled to said vessel for low-temperature coolant; a vessel for high-temperature coolant coupled by means of pipe connections to said inflow and outflow pipelines; a heater mounted in said vessel for high-temperature coolant to heat it to approximately 400°C; valves installed on said pipelines and pipe connections for an alternate connection of each of said vessels to said crystallizer being cooled for the purpose of an alternate inflow to or outflow from the crystallizer of the coolant of the corresponding temperature and for a correspondingly alternate disconnection of said vessels from the crystallizer; a pump connected to said inflow pipeline to alternately deliver the coolant from said vessels to said crystallizer being cooled.

3,874,440

MOULDS FOR PRODUCING LIGHT ALLOY AND OTHER CASTINGS

Albert S. Voisin, 6, rue C.B. Metman, 92200 Neuilly-sur-Seine, France

Filed Dec. 17, 1973, Ser. No. 425,126

Claims priority, application France, Dec. 15, 1972, 72.44828

Int. Cl. B22d *17/00*

U.S. Cl. 164—306 **12 Claims**

1. In a mould for producing castings,

a base plate,

pattern-defining elements supported on the base plate,

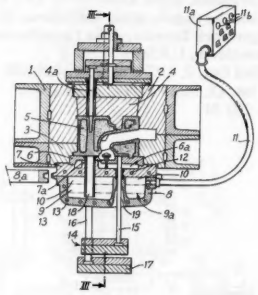
means defining a tank for molten metal, the tank being attached to the base plate,

a plurality of injection tubes communicating the interior of the tank with the interior of the pattern defined by said elements,

first pipe means extending into the tank beneath the level of a bath of molten metal therein, said first pipe means being closable and being arranged to feed molten metal into the tank,

second pipe means communicating with the interior of the tank above the bath of molten metal therein, said second pipe means being arranged for connection to a source of pressurized fluid whereby to pressurize the interior of the

tank, and for connection to a source of vacuum whereby to create a reduced pressure in the interior of the tank; cover means located beneath said base plate and closing said tank;



said cover means including means defining passages therein through which said injection tubes extend and heat-distributing projections on the cover means adjacent the passages.

3,874,441

THERMAL AND ACOUSTICAL PROTECTION OF A LIGHT CONSTRUCTION

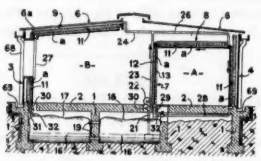
George Duchene, 40 Avenue Victor Cresson, 92 Issy Les Moulineaux, France

Filed July 27, 1972, Ser. No. 275,826

Claims priority, application France, July 29, 1971, 71.27905

Int. Cl. F24f *3/00*

U.S. Cl. 165—1 **19 Claims**



1. Method for thermally and acoustically protecting a construction in which a space is defined by a plurality of wall means, comprising, providing a substantially planar porous fluid conduit layer having intercommunicating pore-like cavities distributed substantially throughout the entire mass of the layer and two opposed surfaces in at least one of said wall means so as to be in a state of heat exchange with said space, directing water from a source of water whose temperature is different from the temperature naturally prevailing within the construction to undergo a bidimensional flow through said fluid conduit layer of intercommunicating pore-like cavities of the porous layer and substantially throughout the entire mass of the layer while maintaining said two surfaces of said layer in contact with means defining fluidtight surfaces, said flow of said water through said pore-like cavities being substantially without pressure and achieved by capillarity and thermally conditioning the space covered by the layer through which water flows.

3,874,442

PACK OF HEAT ABSORBING MATERIAL AND A SUPPORT MEMBER THEREFOR

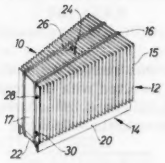
Bo Johnsson, Kungsbacka, Sweden, assignor to Svenska Rotor Maskiner Aktiebolag, Nacka, Sweden

Filed Feb. 9, 1973, Ser. No. 331,245

Claims priority, application United Kingdom, Feb. 16, 1972, 7143/72

Int. Cl. F28d *19/00*

U.S. Cl. 165—10 **19 Claims**



16. A pack of rectangular element plates for rotary regenerative heat exchangers having walled sectorial compartments, comprising:

a stack of plates defining open-ended passages between adjacent plates;

means engaging said plates to at least retain said plates in a preset relative alignment;

a frame structure on which said plates are mounted and supported; and

at least one elongated lift element secured to the frame structure, said lift element having a length so as to extend from the frame structure and to project beyond the plates when the plates are supported on the frame structure, said plates of the stack when positioned in a sectorial compartment being held together and to said lift element by the walls of said sectorial compartment and said frame structure, respectively.

3,874,443

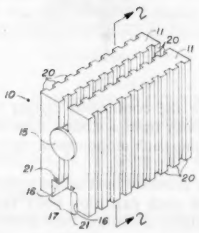
HEAT DISSIPATOR

Joseph V. Bayer, 2214 Monterrey Dr., Kemah, Tex. 77565

Filed July 16, 1973, Ser. No. 379,343

Int. Cl. F24h *3/00*

U.S. Cl. 165—47 **8 Claims**



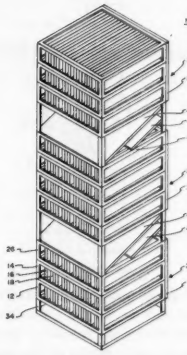
1. A heat sink for dissipating heat from integrated circuits during soldering and desoldering operations comprising: a pair of clip members pivotally connected by hinging means, each of said clip members having a notch along the lower interior edge thereof to form cooperably a jaw engageable with the sides and top of a DIP (Dual-Inline-Pins) integrated circuit; and biasing means between said clip members biasing said jaw into gripping engagement with said DIP integrated circuit.

3,874,444

DUO-BAFFLE AIR SEPARATOR APPARATUS

Salvador Perce, Bellwood, and Anthony Traina, Villa Park, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Dec. 3, 1973, Ser. No. 421,452
Int. Cl. F24h *3/00*
U.S. Cl. 165—47 5 Claims



1. An air separator apparatus for use in a frame of heat dissipating equipment separated into vertical sections being of a generally open construction at the front and sides and being of generally closed construction at the rear with the vertical sections being spaced apart one from the other, said air separator apparatus comprising:

first baffle means located in the spacing between sections of the equipment, said first baffle means including a first substantially air impervious baffle being positioned at an inclined angle to the horizontal and extending from the front to the rear of the equipment frame; and

second baffle means located in the spacing between sections of the equipment, said second baffle means including a second substantially air impervious baffle being positioned vertically below said first baffle and generally parallel to said first baffle, said second baffle being of a shorter dimension as measured from front to rear of the equipment relative to said first baffle, said second baffle extending from the rear of the equipment and terminating at a point before the front of the equipment frame;

said air separator apparatus being effective to thermally isolate intermediate vertical sections of the equipment by separating rising heated air streams having different flow speeds due to the front of the equipment rack having a higher volume of replacement air than the rear of the equipment, the front rising air stream passing between said first and second baffles and out the rear of said equipment, the rear air stream deflecting along the lower surface of said second baffle and out the rear of the equipment.

3,874,445

MULTIPLE VALVE POCKET MANDREL AND APPARATUS FOR INSTALLING AND REMOVING FLOW CONTROL DEVICES THEREFROM

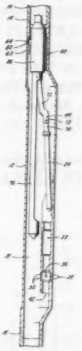
Ben D. Terral, Houston, Tex., assignor to Camco, Incorporated, Houston, Tex.

Filed Dec. 12, 1973, Ser. No. 423,923
Int. Cl. E21b *23/02*
U.S. Cl. 166—117.5 13 Claims

1. A mandrel for use in a well tubing comprising,

a mandrel body including upper and lower connecting means for connecting the mandrel in a well tubing,

said body including an open bore therethrough for communication with the well tubing,



and

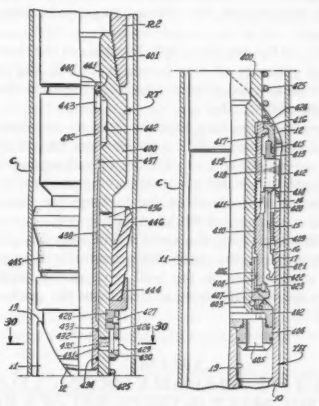
a plurality of flow control device receiving pockets offset frelative to the open bore, said pockets positioned side by side to each other.

3,874,446

TUBING HANGER RELEASING AND RETRIEVING TOOL

Talmadge L. Crowe, Houston, Tex., assignor to Baker Oil Tools, Inc., Los Angeles, Calif.

Division of Ser. No. 275,911, July 28, 1972, Pat. No. 3,830,295, which is a division of Ser. No. 243,806, April 13, 1972, Pat. No. 3,771,603. This application June 3, 1974, Ser. No. 475,427
Int. Cl. E21b *23/00*
U.S. Cl. 166—129 11 Claims



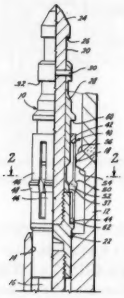
1. In a retrieving tool for releasing a tubing hanger from anchored engagement in well casing and removing said tubing hanger from the well casing, said tubing hanger having a key slot for orienting the retrieving tool, a receptacle for the retrieving tool, a shoulder, and a flow passage leading into the tubing hanger at an off-center location, said retrieving tool comprising: an elongated tubular body having means at its upper end for connecting to a pipe string, a flow passage extending longitudinally in said body from said upper end, passage forming means carried by said body in off-center relation and having a passage communicating with said passage in said body, key means projecting laterally from said body and engageable in the key-slot in said tubing hanger for orienting said passage forming means with the flow passage in

the tubing hanger, and latch means carried by said body and engageable with said shoulder of said tubing hanger to connect said body to said tubing hanger.

3,874,447
COLLET LATCH FOR RELEASABLY LOCKING A FLOW CONTROL DEVICE IN THE POCKET OF A WELL MANDREL

Harold E. McGowen, Jr., deceased, late of No. 6 Huntington Cir., Longview, Tex. 75601 (by Wanda Elizabeth Lyles McGowen, executrix)

Filed Mar. 29, 1974, Ser. No. 456,111
Int. Cl. E21b *23/02*
U.S. Cl. 166—214 **11 Claims**



1. A new and improved latch apparatus for releasably locking a flow control device movable through the bore of a well conduit to a mandrel for locking in the pocket of the mandrel below a locking shoulder of the mandrel, and in which the latch apparatus includes a stem and a sleeve movably mounted about the stem for coacting with a latch means to effect operation of the latch means, the improvement in the latch means comprising,

a plurality of flexible ribs disposed adjacent the sleeve, each of said plurality of ribs having a locking lug mounted therewith at a location intermediate the ends of each of said plurality of ribs;

said plurality of locking lugs movable to and from a first retracted position relative to the stem for enabling desired movement of said plurality of locking lugs past the locking shoulder and a second locking position for engaging the locking shoulder for locking the flow control device in the pocket of the mandrel; and

means for connecting the ends of said plurality of ribs together to hold the ends from inadvertent engagement from obstructions in the well bore as the latch means moves through the bore to and from the pocket of the mandrel.

3,874,448
LATCH FOR RELEASABLY LOCKING A FLOW CONTROL DEVICE IN THE POCKET OF A WELL MANDREL

Harold E. McGowen, Jr. deceased, late of Houston, Tex., and Wanda Elizabeth Lyles McGowen, Executrix, No. 6 Huntington Cir., Longview, Tex. 75601

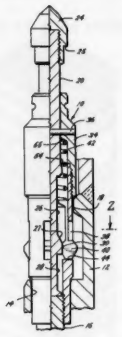
Filed Mar. 29, 1974, Ser. No. 456,112
Int. Cl. E21b *83/02*
U.S. Cl. 166—215 **12 Claims**

1. A latch apparatus adapted for mounting with a flow control device for releasably locking the flow control device in the pocket of a mandrel having a locking shoulder, comprising:

a stem;

body means mounted with said stem and having a plurality of windows formed therethrough;

a lug for each of said plurality of windows and confined for limited movement by said body means to and from a first retracted position for enabling movement of the flow control device past the locking shoulder and a second locking position for engaging the locking shoulder to



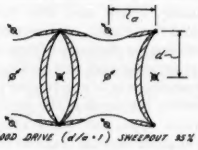
secure the flow control device in the pocket of the mandrel; and

means for moving each of said plurality of lugs from the first retracted position to the second locking position upon longitudinal movement of said lugs past said locking shoulder.

3,874,449
TERTIARY RECOVERY OPERATION

Donald L. Hoyt, Houston, Tex., and Anthony F. Altamira, Dhahran, Saudi Arabia, assignors to Texaco Inc., New York, N.Y.

Filed Oct. 17, 1973, Ser. No. 407,112
Int. Cl. E21b *43/16*
U.S. Cl. 166—245 **3 Claims**

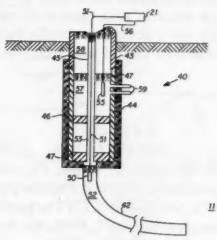


1. At the conclusion of a secondary recovery operation in a method of producing formation fluids including hydrocarbons from a subterranean hydrocarbon-bearing formation by a direct line drive which comprises penetrating said formation with a plurality of wells disposed in a linear pattern and comprising a series of a pair of production wells and an intermediate injection well, injecting an extraneous fluid into each formation via said intermediate injection well of said series to displace formation fluids including hydrocarbons in said formation toward said production wells, producing said formation fluids including hydrocarbons from said formation via said production wells till breakthrough of said extraneous fluid thereat, thereupon initiating a tertiary recovery operation by imposing a new set of flow gradients comprising the steps of shutting in the intermediate injection wells in alternate series and converting production wells in the series adjacent thereto into injection wells, and thereupon injecting said extraneous fluid via the remainder of the intermediate injection wells of said series and the converted production wells of said series, and producing formation fluids via the remainder of said production wells.

3,874,450
METHOD AND APPARATUS FOR ELECTRICALLY HEATING A SUBSURFACE FORMATION

Loyd R. Kern, Irving, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 12, 1973, Ser. No. 424,099
Int. Cl. E21b *43/16, 43/24*
U.S. Cl. 166—248 **10 Claims**



5. In the art of electrically heating an electrically conductive formation by positioning a pair of spaced apart electrodes therein and passing a current therebetween through the formation, the method of increasing the linearity of the current paths between said electrodes comprising the steps of positioning at least one of said electrodes within a deviated section of wellbore extending laterally within said formation in a direction transverse to the direction between said pair of electrodes and establishing electrical continuity between said at least one electrode and the surrounding formation substantially over the interface between said formation and said deviated wellbore section.

6. In the art of electrical heating of an electrically conductive formation by passage of an electric current therethrough, the improvement comprising:

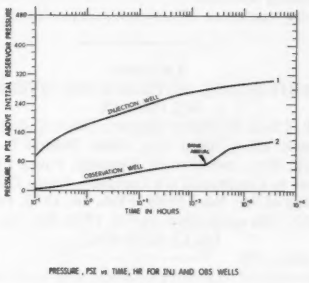
a. a wellbore extending from the surface downwardly into the formation consisting of an upper vertical section and a lower deviated section extending from the bottom of said upper vertical section laterally for a predetermined distance from said upper vertical section and in a predetermined direction,
b. an electrolyte adapted to at least partially fill said lower deviated section and to thereby communicate with said formation along the interface thereof with said lower deviated section,
c. an insulating oil filling said wellbore above the level of said electrolyte,
d. conductive means extending within the wellbore from the surface and adapted to contact said electrolyte, and
e. means for connecting a source of electrical potential to said electrolyte through said conductive means.

3,874,451
DETERMINATION OF OIL SATURATION IN A RESERVOIR

Stanley C. Jones, and Robert W. Parson, both of Littleton, Ohio, assignors to Marathon Oil Company, Findlay, Ohio

Filed Apr. 12, 1974, Ser. No. 460,393
Int. Cl. E21b *49/00*
U.S. Cl. 166—252 **7 Claims**

1. A process of determining in situ the average oil saturation in an oil-bearing reservoir in fluid communication with at least one observation well removed from the injected well, and wherein the oil saturation in the reservoir is not equal to the oil saturation in the below defined oil-water bank and/or the mobility of the fluids flowing ahead of the oil-water bank is not equal to the mobility of the fluids within the oil-water bank, the process comprising injecting into the reservoir sufficient volume of a displacing fluid to substantially displace the formation fluids toward the observation well and to obtain a stable oil-water bank at the observation well, determining the time of arrival of the oil-water bank at the observation well, and thereafter determining the average oil saturation by the following formula:



PRESSURE, PSI vs TIME, HR FOR INJ AND OBS WELLS

$$S_{oi} = f_{ob}\,(1 - V_i) + f_{ol}\,V_i$$

wherein S_{oi} is the average oil saturation between the injection well and the observation well, f_{ob} is the fractional flow of oil in the oil-water bank, V_i is the pore volume of displacing fluid injected into the injection well to obtain arrival of the oil-water bank at the observation well, and f_{ob} is the fractional flow of oil before arrival of the oil-water bank.

3,874,452
RECOVERY OF VISCOUS PETROLEUM FROM ASPHALTIC PETROLEUM CONTAINING FORMATIONS SUCH AS TAR SAND DEPOSITS

Joseph C. Allen, Bellaire, and Charles D. Woodward, Houston, both of Tex., assignors to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 344,302, March 23, 1973, abandoned. This application Mar. 11, 1974, Ser. No. 449,812
Int. Cl. E21b *43/24*
U.S. Cl. 166—260 **12 Claims**

1. A method for recovering hydrocarbons from a subterranean, porous formation containing viscous petroleum having a high asphaltic content including tar sand deposits, penetrated by at least one injection well and at least one production well comprising:

a. injecting into the formation via the injection well, a deasphalting solvent selected from the group consisting of N-methyl-2-pyrrolidone, furfural, and mixtures thereof, precipitating asphaltic petroleum on solid surfaces of the formation, the precipitated asphaltic petroleum being utilized as a fuel;
b. injecting air into the formation via the injection well following the solvent injection;
c. igniting a portion of the formation adjacent the injection well; and
d. continuing air injection while recovering petroleum from the production well.

3,874,453
RECOVERY OF VISCOUS ACIDIC CRUDE OILS

Robert H. Friedman, Houston, Tex., assignor to Getty Oil Company, Los Angeles, Calif.

Filed Dec. 6, 1972, Ser. No. 312,674
Int. Cl. E21b *43/22, 43/27*
U.S. Cl. 166—270 **10 Claims**

1. A method for recovery of highly acidic petroleum crude oil having a viscosity of at least on the order of about 1000 cp at 75°F, from an underground formation having therein at least one injection well and at least one producing well, comprising:

injecting through an injection well an aqueous solution of barium hydroxide;

said barium hydroxide reacting with the acidic crude oil to form an oil-soluble soap, and said soap further reacting with said crude to form a grease-like barrier layer;

injecting a pushing agent through said injection well to push said crude, from behind said barrier layer, toward said producing well; and

producing said crude oil through said producing well.

3,874,454

WATERFLOODING METHOD USING OVERBASED SULFONATE

Charles R. Clark; M. Duane Gregory; Oliver C. Kerfoot; Fred C. Veatch, all of Ponca City, Okla.; Delmar D. Krehbiel, Lubbock, Tex., and Carl D. Kennedy, Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Division of Ser. No. 335,995, Feb. 26, 1973, Pat. No. 3,847,823. This application Apr. 8, 1974, Ser. No. 458,942

Int. Cl. E21b *43/22*

U.S. Cl. 166—270 **11 Claims**

1. A method for recovering hydrocarbons from a petroliferous formation which comprises injecting into the formation an effective amount of an aqueous mixture which contains about 0.5 to about 25 weight percent of an overbased anionic waterflood additive; the anionic waterflood additive comprising a water-soluble alkali metal hydrocarbon sulfonate plus an oil-soluble alkali metal hydrocarbon sulfonate plus an overbasing amount of a base component selected from the alkali metal hydroxides such that the ratio "weight of excess base component/ weight of sulfonate" is about 0.03 to about 2.0; and recovering the displaced hydrocarbons from the formation.

3,874,455

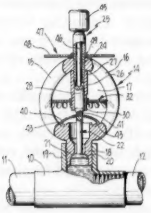
AUTOMATIC SPRINKLER VALVE

Gerald F. Klesow, 905 Holiday Ct., Concord, Calif. 94518

Filed June 20, 1974, Ser. No. 481,565

Int. Cl. A62c *37/06*

U.S. Cl. 169—19 **7 Claims**



1. An automatic sprinkler apparatus for fire extinguishing systems comprising:

a frame member having a pair of joined bowed arms defining a hollow interior, said frame member having a first end portion including an externally threaded boss member adapted to be threadably engaged with a water supply line, said boss member having an internal bore providing a valve seat, said frame member having a second end portion with an internally threaded bore;

a valve actuation member threadably engaged in said second end portion, said valve actuating member having an externally threaded substantially cylindrical mounting member, a temperature sensitive element carried by said mounting member including an expansion element whose volume is a function of ambient temperature, a valve actuation spindle coupled to said expansion element for actuation thereby, and shield means secured to said mounting member for shielding said temperature sensitive element from projected water droplets;

a guide means secured to said mounting member and having a hollow interior;

water deflector means secured to said guide means in said interior of said frame member for deflecting water into a desirable spray pattern;

a stem valve reciprocably received in said guide means for controlling the egress of water coupled to the inlet of said boss from said water supply line; and

biasing means for urging said stem valve towards a normally closed position wherein said valve is in contact with said valve seat, said valve actuating spindle being normally in contact with the free end of said stem valve.

3,874,456

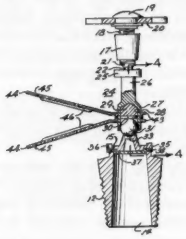
SPRINKLER

Fred A. Gloeckler, Huntington Valley, Pa., assignor to Star Sprinkler Corporation of Florida, Philadelphia, Pa.

Filed Sept. 12, 1972, Ser. No. 288,279The portion of the term of this patent subsequent to Dec. 7, 1988, has been disclaimed.

Int. Cl. A62c *37/08*

U.S. Cl. 169—39 **7 Claims**



1. A sprinkler which comprises

a frame,

a deflector carried on said frame,

said frame having a portion with a hollow bore terminating at a valve seat,

a closure cap for said valve seat, and

means including a strut having a portion of eutectic alloy with a predetermined melting temperature normally holding said closure cap seated on said valve seat, and

means mounted on said strut for transmitting heat to said strut including outwardly extending fins.

3,874,457

FIRE BAG FOR COTTON BALE

Tommy K. Thrash, Lubbock, Tex., assignor to Kwik-Out Manufacturing Company, Lubbock, Tex.

Filed Jan. 28, 1974, Ser. No. 437,510

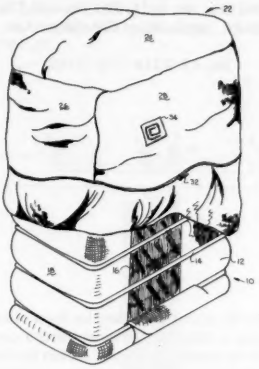
Int. Cl. A62c *1/18*

U.S. Cl. 169—47 **7 Claims**

1. The method of extinguishing fires in bales of cotton comprising:

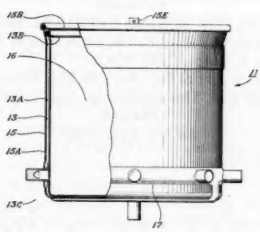
a. enveloping the bale of cotton in air impervious, pliable material,

b. slipping a fabric bag partially over the bale,
c. rolling the partially bagged bale, then



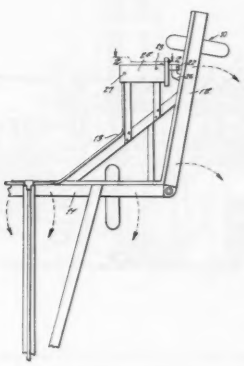
d. completing the bagging, and
e. sealing an opening in the bag.

3,874,458
FIRE EXTINGUISHER
Robert A. Williams, Fort Worth, Tex., assignor to Pyro Control Inc.
Filed Nov. 12, 1973, Ser. No. 414,642
Int. Cl. A62c *35/02*
U.S. Cl. 169—59 **2 Claims**



1. A fire extinguisher comprising:
a closed container,
a fire extinguishing gas under pressure located in said closed container,
an outer container encompassing said closed container,
a plurality of spaced charge containers located next to said closed container and extending through said outer container and held between said closed and outer containers, a shaped charge located in each of said charge containers to cause perforation of said closed container when actuated to allow said fire extinguishing gas to pass out of said closed container through the perforations formed, and
a firetrain extending between said charge containers to cause all of said shaped charges to be actuated substantially simultaneously in the presence of temperature above an undesired level.

3,874,459
OUTRIGGER LOCKUP
Joe F. Herberholz, General Delivery Hettinger County, New England, N. Dak. 58647
Filed Mar. 8, 1973, Ser. No. 339,335
Int. Cl. A01b *15/14, 63/00*
U.S. Cl. 172—311 **1 Claim**

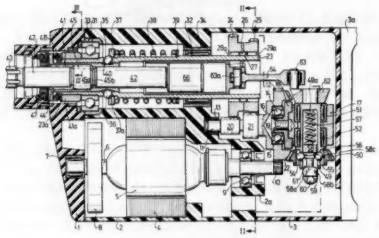


1. In an outrigger lockup the combination of a pneumatically operated cylinder activating a mechanism securing a stub affixed on a pivotable outrigger supported on an agricultural equipment, said cylinder being connected to an air hose leading from an air tank and air compressor mounted on a tractor, said outrigger lockup eliminating need of manual locking by an operator to leave a tractor seat and walk around an upright outrigger before it is locked, said mechanism comprising a U-shaped loop pivotally secured at one end to a stationary frame of said agricultural equipment, the other end of said loop releasably hooking around said outrigger stub, a longitudinal center of said loop pivotally engaging a longitudinal center of a lock latch, an end of said lock latch being pivotally connected to a spring loaded piston rod of said pneumatic cylinder, a rear end of said cylinder being pivotally supported on said stationary frame, said stationary frame including a locking recess into which an opposite end of said lock latch is receivalbe, a first stop integral with one side of said recess so to form a corner in which said lock latch opposite end abuts when said loop is in a locked position around said stud, and a second stop being integral with said loop, whereby when said piston pushes said lock latch said opposite end of said lock latch is pivoted outward of said recess and abuts said second stop so that continued push of said piston causes said lock latch to roll around said second stop, thus pivoting said loop therewith and lift it from around said stud.

3,874,460
IMPACT WRENCH
Wolfgang Schmid, Plattenhardt; Manfred Bleicher, Leinfelden; Gernot Hansel, Stuttgart-Plieningen, and Karl Wanner, Echterdingen, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany
Filed Oct. 29, 1973, Ser. No. 410,859
Claims priority, application Germany, Oct. 28, 1972, 2252951
Int. Cl. B25d *11/00*
U.S. Cl. 173—109 **22 Claims**

1. In a portable power tool, particularly in an impact wrench, a combination comprising a housing; a tool holder rotatably and axially movably installed in said housing; a prime mover mounted in said housing and having a rotary

output member; means for rotating said tool holder, including a multi-speed transmission actuatable to transmit torque from said output member to said tool holder, said multi-speed transmission including an intermediate shaft parallel to said output member, a driven shaft parallel to said intermediate shaft and coaxial with said tool holder, a safety clutch normally coupling said tool holder with said driven shaft, a first gear rigid with said output member, a second gear rigid with said intermediate shaft and meshing with said first gear, third



and fourth gears rigid with said intermediate shaft, and fifth and sixth gears coaxial with and movable axially of said driven shaft to and from operative positions in which said fifth and sixth gears respectively mesh with said first and fourth gears and thereby transmit torque to said driven shaft, said fifth gear being movable to said operative position thereof when said sixth gear is out of its operative position and vice versa; and means for moving said tool holder lengthwise, including a second transmission actuatable to transmit to said tool holder axial impulses in response to rotation of said output member.

3,874,461

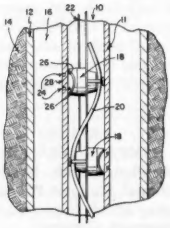
PERFORATING APPARATUS

Robert D. Cocanower, Fort Worth, Tex., assignor to The Western Company of North America, Fort Worth, Tex.

Filed Aug. 16, 1973, Ser. No. 388,992

Int. Cl. E21b *43/117*

U.S. Cl. 175—4.6 **10 Claims**



1. Perforating apparatus comprising:

a charge carrier having a shaped charge carried therein, said carrier having in an outer wall surface thereof a groove defining a thin wall area, said groove surrounding a thicker wall area, said surrounded thicker wall area having a thickness greater than the thickness of said thin wall area over substantially the entire surrounded area.

3,874,462

DEVICE FOR TAKING CORE SAMPLES FROM OCEAN AND OTHER SUBMARINE FLOORS

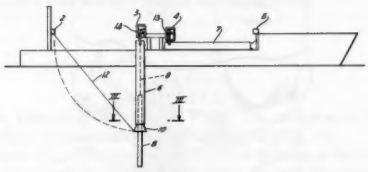
Horst Harms, Bremerhaven, and Wilhelm Lucht, Nordenham, both of Germany, assignors to Aktiengesellschaft "Weser", Bremen, Germany

Filed Jan. 18, 1974, Ser. No. 434,576

Claims priority, application Germany, Apr. 27, 1973, 2321291

Int. Cl. E21b *7/12, 25/00*

U.S. Cl. 175—5 **3 Claims**



1. In a device for taking core samples from ocean and other submarine floors, a combination comprising a core barrel for taking a core from a submarine floor; means for deploying and recovering said core barrel, said means comprising a guide tube having a center passage dimensioned for movement of said core barrel therethrough and provided with two end portions one of which is provided with an open end for entry and exit of said core barrel, said center passage having in the region of said open end a cross-section which conically diverges towards said open end, and barrel-guiding elements within said passage for guiding said core barrel during movement in said passage; and at least two shipboard-mounted deploying and recovering units for said guide tube, each connected with one of said end portions of the latter and having a shipboard-mounted first portion, and a second portion guided by and movable along said first portion between a first position in which said second portion projects at least in part overboard, and a second position in which said second portion is fully retracted onboard.

3,874,463

MEANS FOR BORING PARALLEL HOLES

Charles L. Hicks, and Raymond R. Leon, both of 123 Henshaw Ave., Space 8, Chico, Calif. 95926

Continuation-in-part of Ser. No. 239,223, March 29, 1972, Pat. No. 3,805,899. This application Aug. 1, 1973, Ser. No. 384,468

Int. Cl. E21c *9/00*

U.S. Cl. 175—53 **26 Claims**

1. A tool for forming substantially parallel first and second bores, each of said bores defining separate first and second axes, respectively, comprising:

a first rod member, having a third axis defined therealong and contoured to fit into an existing bore with said third and first axes substantially coaxial;

a pointed piercing second rod member having a fourth axis therein along said piercing member;

a spacing and cutting member attaching said piercing rod member in predetermined spaced relation, with said third and fourth axes substantially parallel to said first rod member; and

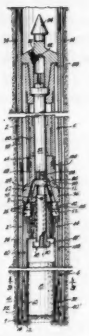
broach means on said first rod member for enlarging said existing bore.

3,874,464

PROCESS OF DRILLING AN EARTH FORMATION

Gerald T. Sweeney, Federal Way, Wash., assignor to Tigre Tierra, Inc., Puyallup, Wash.

Division of Ser. No. 283,208, Aug. 23, 1972,. This application June 3, 1974, Ser. No. 475,595
Int. Cl. E21b *1/06, 5/00, 49/02*
U.S. Cl. 175—58 24 Claims



1. In the process of drilling an earth formation using a rotary drill rod comprising an elongated pipe having a longitudinally extending bore therethrough and percusive bit at the distal end thereof, the steps of providing relatively transverse the bore adjacent the bit an abutment which is operatively connected with the bit to receive and transmit hammer blows into the working face of the bit, inserting into the bore of the pipe, a piston-like member which is slidably engagable with the wall of the bore and has a hammer mechanism thereon, reciprocating the hammer of the mechanism between the member and the abutment to apply blows to the abutment, while passing fluid through the member and exhausting the fluid into the region adjacent the working face of the bit, discharging the exhausted fluid from said region toward the proximal end of the pipe on the opposite side of the pipe from the piston-like member and generating a pressure differential across the piston-like member longitudinally of the bore to maintain the hammer mechanism in operative relationship to the abutment during the application of the blows.

3,874,465

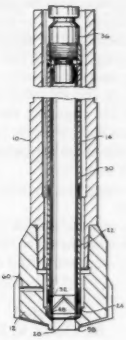
CORING APPARATUS

John Wallace Young; Robert Charles Firkins, both of Flatonia; Gregg Ring, and John A. Tatum, Jr., both of Houston, all of Tex., assignors to The Randolph Company, Houston, Tex.

Filed Oct. 2, 1973, Ser. No. 402,920
Int. Cl. E21b *25/00*
U.S. Cl. 175—236 15 Claims

1. A formation coring apparatus, comprising a tubular member having rigid semitubular members joined along at least one of their adjacent edges by a resilient, flexible material,

said semitubular members being of a material on their inner



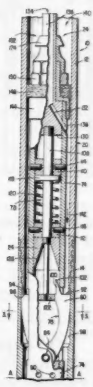
surface suitable for supporting a loose core from a soft formation without damaging such core.

3,874,466

CORE TUBE PLACEMENT AND RETRIEVAL

Emory Eugene Fulford, Austinville, Va., assignor to The New Jersey Zinc Co., Austinville, Va.

Filed Apr. 19, 1974, Ser. No. 462,447
Int. Cl. E21b *25/00, 9/20*
U.S. Cl. 175—236 9 Claims



1. A coring tool for attachment to a hollow drill string having thereon an annular bit operative inside a bore hole, the tool comprising an elongate pumpable core tube, mounted for movement between a first position in core receiving relation to the bit and a second position spaced axially along the drill string from the first position, the tube comprising:

means for sealing between the tube exterior and the drill string interior for driving the tube toward the bit upon application of pressure thereto through the drill string;

a latch movable between a latched position for securing the tube at the first position to the drill string and an unlatched position freeing the tube for movement through the drill string;

means for holding the latch in the latched position and for holding the latch in the unlatched position, the holding means including

an actuating member extending longitudinally of the core tube;

means reciprocably mounting the member between first and second positions;

a first element on the member operative in the first position thereof for engaging the latch and holding the same in the latched position; and

a second element on the member operative in the second position thereof for engaging the latch and holding the same in the unlatched position; and

means for moving the member beween the first and second positions thereof including

means normally biasing the member toward the first position thereof; and

means pumpable down the drill string for securement to the core tube for moving the member to the second position thereof upon securement to the core tube.

3,874,467

BEAM SCALE

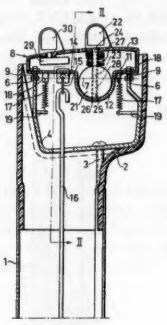
Bengt Rjork; Bertil Gustafsson, both of Huskvarna, and Leif Johansson, Nassjo, all of Sweden, assignors to AB Stathmos, Jonkoping, Sweden

Filed Feb. 7, 1974, Ser. No. 440,389

Claims priority, application Sweden, Feb. 26, 1973, 7302627

Int. Cl. G01g *1/36*

U.S. Cl. 177—250 **5 Claims**



1. In a beam scale having a balance beam which is pivotable on an edge line, and at least one sliding weight which is displaceable along the balance beam, the improvement comprising the balance beam having a longitudinal channel therein and a weight movably disposed within said channel.

3,874,468

ELECTRIC CONTROLS FOR HYDROSTATIC TRANSMISSIONS

Probir K. Chatterjea, Des Plaines, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed Apr. 9, 1973, Ser. No. 349,133

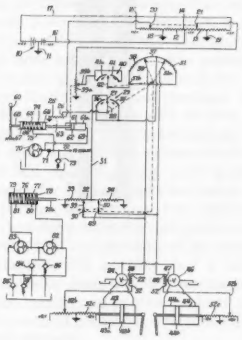
Int. Cl. B62d *11/04*

U.S. Cl. 180—6.48 **10 Claims**

1. In a vehicle in which two drive mechanisms are driven at the same speed in a given direction for straight forward movement of the vehicle, at the same speed in the opposite direction for straight rearward movement of the vehicle, and in opposite directions or at different speeds in the same direction for steering of the vehicle; two actuators control the direction of drive of the drive mechanisms by the sign of the voltages impressed across the actuators, and the speeds of the drive mechanisms by the amount of impressed voltages and the balancing out thereof by equal feed-back voltages produced by the occurrence of the desired speeds of the drive mechanisms; and a joy stick is moved forwardly and rearwardly for forward and rearward movement of the vehicle and to the right and to the left for turning of the vehicle; the combination with the actuators and the joy stick, or

a. a direction unit comprising first and second electrical resistances connected across a source of power, arranged in parallel with one another by connections between their ends, and extending generally in opposite directions from their connections with one another, said unit further comprising first and second takeoff leads contacting the first resistance and the second resistance, respectively, and being conjointly movable with respect thereto;

b. means connecting the joy stick with the direction unit to enable forward movement and rearward movement of the joy stick to produce movement in one direction and in the opposite direction of the first and second take-off leads with respect to the first and second resistances;



c. a steering unit comprising third and fourth resistances arranged in parallel with one another by connections between their ends and extending in opposite directions from their connections with one another; the first and second take-off leads, respectively, being connected with one connection and the other connection between the ends of the third and fourth resistances, the steering unit further comprising third and fourth leads contactable with the third and fourth resistances, respectively, and being connected with one actuator and the other actuator respectively; and

d. means connecting the joy stick with the steering unit to enable rightward movement and leftward movement of the joy stick to produce conjoint movement of the third and fourth resistances with respect to the third and fourth take-off leads in one direction and in the opposite direction, respectively.

3,874,469

AGRICULTURAL MACHINE

Stig Lennart Sjovall, Kavlinge, Sweden, assignor to Svenska Sockerfabriks AB, Malmo, Sweden

Filed May 15, 1973, Ser. No. 360,497

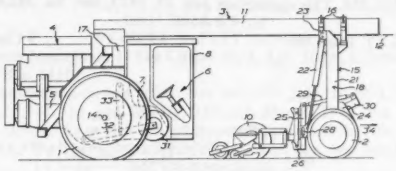
Claims priority, application Sweden, May 17, 1972, 6428/72

Int. Cl. B60k *55/00*

U.S. Cl. 180—12 **9 Claims**

1. An agricultural machine having a frame, driving wheels and supporting wheels supporting the frame, a driving unit coupled to the driving wheels, a driver's station having means for controlling the driving unit, said frame including a substan-

tially vertical front portion attached to said supporting wheels, a coupling means for agricultural implements fixed to the lower end of the front portion, said coupling means being situated between the supporting wheels and the driving wheels, said frame including a rear portion to which the driving unit and the driving wheels are attached, said driver's station situated forward of the rear portion, said frame having an intermediate portion in the form of a unitary beam having a front end connected to the upper end of the front portion and a rear end rigidly connected to the rear portion above the driver's station.

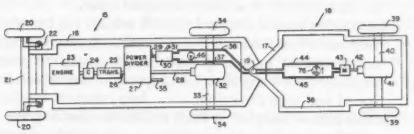


3,874,470

PRESSURE-RESPONSIVE DISPLACEMENT CHANGER FOR VEHICULAR DRIVE SYSTEM HAVING A VARIABLE DISPLACEMENT PUMP

Clarence Kirk Greene, Arlington Apt., 100 N. Arlington Ave., Reno, Nev. 89501

Filed May 31, 1973, Ser. No. 365,493
Int. Cl. B62d *59/04*
U.S. Cl. 180—14 A **16 Claims**



1. In a self-propelled vehicle means having a power plant, a primary driving element situated on one transverse axis and a secondary driving element situated on another transverse axis, a drive system which includes:

a. a torque divider having an input drivenly coupled to said power plant, a first output coupled to the said primary driving element, and a second output coupled to a pump, a hydraulic motor coupled drivingly to the secondary driving element, and interconnecting supply and return ducts between the pump and the motor for driving the motor from the pump, and

b. means sensitive to the pressure within the return duct for increasing the pressure within said duct upon a rise in the pressure therein.

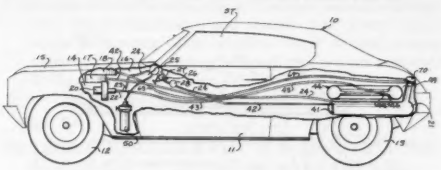
3,874,471

FUEL FEEDING SYSTEM FOR A VEHICLE

Earl W. Kloefkorn, Manchester, Okla. 73758

Filed Dec. 16, 1969, Ser. No. 885,464
Int. Cl. B60k *15/02*
U.S. Cl. 180—54 R **9 Claims**

1. In a vehicle, engine means, liquid fuel tank means connected to said engine means for supplying liquid fuel thereto, accumulator means connected to said liquid fuel tank means, said accumulator means having pressure fluid means therein for forcing liquid fuel from said liquid fuel tank means to said engine means, compressor means connected to said accumulator means and said liquid fuel tank means for supplying pressure fluid thereto, emergency pressure fluid cylinder means connected to said fuel tank means, and two-way valve means connected in such a manner as to permit the flow of pressure fluid to said fuel tank means when the flow of pressure fluid from said compressor means and said accumulator means has been cut off.

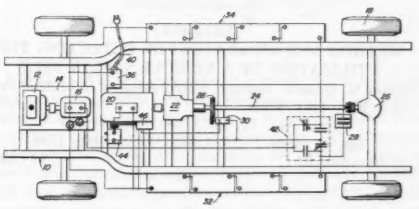


3,874,472

BATTERY POWERED VEHICLE DRIVE

Clifford T. Deane, South Charleston, W. Va., assignor to West Virginia High Bird Corp., St. Albans, W. Va.

Filed Jan. 25, 1974, Ser. No. 436,683
Int. Cl. B60l *11/12*
U.S. Cl. 180—65 R **6 Claims**



1. In combination with a vehicle having an internal combustion engine, a drive propelling transmission and a flywheel driven by the transmission, a drive motor connected to the transmission for propelling the vehicle, generator means driven by the engine for generating a source of electrical energy, at least two energy storing battery assemblies for alternately storing the electrical energy output of the generator means, charging circuit means connected to the generator means for charging one of the battery assemblies while the other of the battery assemblies is energizing the drive motor, an auxiliary generator continuously driven by the flywheel and connected to the charging circuit means, and coast control means connected to the auxiliary generator for enabling the same under coasting conditions of the vehicle to charge one of the battery assemblies.

3,874,473

POWER STEERING APPARATUS FOR TOWING

John L. Grove, Greencastle, Pa., assignor to Fulton Industries, Inc., McConnellsburg, Pa.

Filed Oct. 5, 1973, Ser. No. 404,046
Int. Cl. B62d *5/08*
U.S. Cl. 180—79.2 R **13 Claims**

1. In combination:

a. a vehicle power steering system comprising

i. dirigible wheel means,

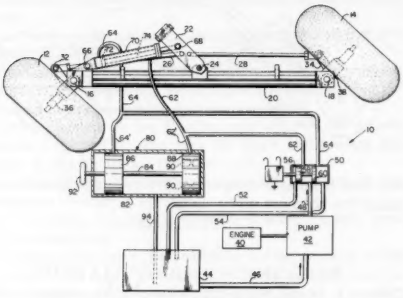
ii. a horizontally swinging tow bar,

iii. means connecting said tow bar and said wheel means for conjoint movement,

iv. hydraulic motor means mechanically connected to said tow bar,

v. a pump hydraulically connected to said motor means, vi. steering control valve means for selectively controlling the flow of fluid from said pump to said motor means, and

b. selectively actuable hydraulic means connected to said system for permitting in one position thereof fluid forced by said motor means when said wheel means are steered



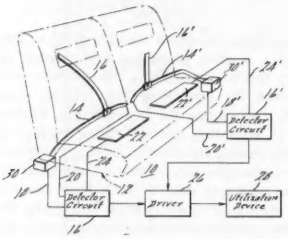
by said tow bar and said pump is inactive to flow from one side of said motor means to the other side thereof and to and from a reservoir.

3,874,474

METHOD AND APPARATUS FOR DETECTING THE UTILIZATION OF A VEHICLE SAFETY BELT

Norman G. Quantz, Algonac, Mich., assignor to Lectron Products, Inc., Troy, Mich.

Filed Nov. 12, 1973, Ser. No. 414,867
Int. Cl. B60r *21/10*; **G08b** *21/00*; **H02g** *3/00*
U.S. Cl. 180—82 C **27 Claims**



1. In a vehicle for an occupant having an ignition switch and a power supply including a battery, an apparatus comprising:

conductor means positioned to be proximate said occupant when said occupant is in a predetermined relationship with said vehicle;

oscillating means connected to said conductor means for supplying oscillating electrical energy to said conductor means and for supplying an output signal when said occupant is in said predetermined relationship with said vehicle; and

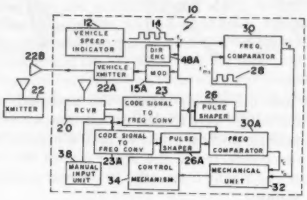
input means for said oscillating means connecting said oscillating means to said power supply so that said oscillating means remains connected to said battery when said ignition switch is opened to provide an indication when said occupant is in said predetermined relationship with said vehicle even when said ignition switch is opened, said input means providing a relatively high input impedance to said oscillating means from said supply means for providing sufficient power to said oscillating means for operation of said oscillating means but limiting said power to said oscillating means to a level which allows operation of said oscillating means for long periods of time without excessive drain on said battery.

3,874,475

VEHICLE CLOSING SPEED LIMITER AND PERFORMANCE MONITORING SYSTEMS

Albert A. Permut; Ronald M. Permut, and Alan R. Permut, all of 6995 Sweetwater Ct., Boulder, Colo. 80301

Continuation of Ser. No. 143,079, May 13, 1971, Pat. No. 3,763,954. This application July 23, 1973, Ser. No. 382,076
Int. Cl. B60k *31/00*
U.S. Cl. 180—98 **9 Claims**



1. A system for controlling the closing speed between two vehicles traveling in the same direction and substantially in the same lane of traffic, the system comprising:

first means coupled in each of said vehicles for generating a first sequence of pulses at frequencies which are directly related to each vehicles own speed, respectively;

direction means in each vehicle for determining the direction of travel or heading of each vehicle, with further means for converting said direction of travel or heading of each vehicle to a discrete digital code,

transmitting means coupled in each vehicle for transmitting rearward from said vehicles a continuous electromagnetic energy beam including modulation means to transmit digitally coded signals which represent the vehicle's own speed and own direction,

further means coupled in each vehicle for limiting the zone of influence of said transmitted coded signals to a predetermined distance and angular beam width extending rearward from said vehicles so as to establish a predetermined and limited zone of influence with respect to vehicles following in train behind the transmitting vehicle,

receiving means coupled in each vehicle for receiving said coded transmitted signals, said coded signals representing the speed and direction of the vehicle in front of the receiving vehicle, when the receiving vehicle is within said zone of influence and substantially in the same lane of traffic with the vehicle in front,

second means in each vehicle coupled to said receiving means for decoding said speed and direction signals received from said transmitting vehicle to provide a first output which is frequency related to the speed of said transmitting vehicle and a second output which is digitally coded to represent the direction of travel or heading of said transmitting vehicle when said receiving vehicle is within the said zone of influence of said transmitting vehicle,

third means in each vehicle coupled to said first means to provide a third output which is frequency related to said receiving vehicle's own speed and a fourth output coupled to said direction means which is digitally coded to represent the direction of travel or heading of said receiving vehicle,

fourth means in each vehicle coupled to said third means for digitally determining the frequency difference between said first output and said third output when the said second output and said fourth output are substantially the same,

fifth means in each vehicle coupled to said fourth means to provide a fifth output when the frequency of said third

output exceeds or is greater than the frequency of said first output providing said second output and said fourth outputs are substantially the same,

sixth means coupled in each vehicle for providing a first force proportional to said fifth output.

3,874,476

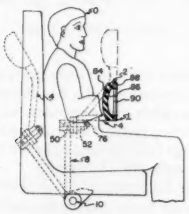
VEHICLE SAFETY DEVICE

James Monaghan, 11849 Clifton Blvd. Apt. 204A, Lakewood, Ohio 44107

Continuation-in-part of Ser. Nos. 163,329, July 16, 1971, Pat. No. 3,741,330, and Ser. No. 250,413, May 4, 1972, Pat. No. 3,759,343, which is a continuation-in-part of Ser. No. 163,379,. This application May 14, 1973, Ser. No. 360,344

Int. Cl. B60r *21/08*

U.S. Cl. 180—103 **22 Claims**



1. A reusable vehicle safety device adapted for restraining a vehicle driver from movement and being particularly adapted to permit the driver to vacate his seat in either lateral direction without delay in order to minimize entrapment, said device being capable of operation to emplace, position or remove the same by using one hand, said device comprising, a resilient restraint pad,

a transversely extending rigid crossmember supporting said pad thereon,

adjustment means for manually adjusting said restraint pad between a restraint position in front of and in close proximity to the driver's torso, and a retracted storage position permitting said driver to vacate his seat in either lateral direction,

said adjustment means operatively connecting said transverse crossmember to said vehicle and including,

a transversely extending pivot shaft mounted on said vehicle,

a rotatable support arm pivotally connected at one end thereof to said pivot shaft to permit rotation of said rotatable arm in a longitudinally extending vertical plane disposed between the occupant's torso and the vehicle's adjacent exterior, between said storage position rearwardly of said driver and a holding position forwardly of said driver,

said support arm pivotally connected at the other end thereof to said crossmember to permit rotation of said restraint pad in a transversely extending vertical plane, between said restraint position and said holding position, and

a clutch mechanism for releasably locking said device in said restraint position and in said holding position,

said clutch mechanism including manually actuated release means on said crossmember for releasing said clutch mechanism to enable movement of said device, whereby said device may be moved between said restraint position, said holding position, and said storage position by said driver actuating said release means and moving said device with one hand,

sensing means for sensing a vehicle accident event effective when said restraint pad is in said restraint position,

power means for moving said restraint pad from said restraint position into contacting engagement with said driver, and

actuation means for actuating said release means to release said clutch mechanism and actuate said power means upon the sensing of an accident event by said sensing means to move said restraint pad into contact with said driver.

3,874,477

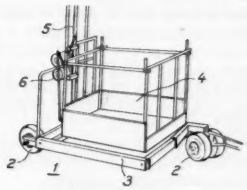
METHOD AND ARRANGEMENT FOR SHORING UP THE BASE FRAME OF LIFTS HOISTS AND THE LIKE

Ture E. Hedstrom, Tjadervagen 35, 141 72 Huddinge, Sweden

Filed Mar. 21, 1973, Ser. No. 343,255

Int. Cl. E04g *1/24*

U.S. Cl. 182—141 **4 Claims**



1. A method of shoring up the base frame of lifts, hoists and the like on a supporting surface, said base frame having guide means, a cage mounted on said guide means for up and down movement and drive means for moving the cage, characterized by activating the drive means to lift the cage from the base frame, connecting support means to said cage, lowering said cage with said support means into engagement with the supporting surface to life the base frame, introducing props between the base frame and the supporting surface, raising the cage and lowering the base frame onto the props.

3,874,478

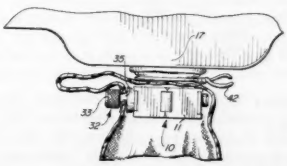
CRANKCASE DRAIN VALVE WITH ATTACHMENT FOR DISPOSABLE OIL BAGS

Cornelius Mantell, Jr., 5107 N. 28th Dr., Phoenix, Ariz. 85017

Filed Mar. 20, 1974, Ser. No. 453,106

Int. Cl. F16n *31/00*

U.S. Cl. 184—1.5 **5 Claims**



1. A drain plug assembly for use on an automotive crankcase comprising in combination:

a plug threadedly receivable in a threaded opening in the bottom of a crankcase and provided with a drain bore extending axially therethrough,

said plug being provided with a polygonal shaped outer surface along a first part of its length for engagement by a tool for threading it into the threaded opening of the crankcase and a cylindrically shaped portion along a second part of its length,

said first part of said plug being provided with a valve bore extending laterally through said drain plug and intersecting said drain bore,

a valve core for removably positioning longitudinally thereof into said valve bore with an interference fit to seal said drain bore,

spring means for detachably clamping around at least a part of the outer periphery of said first part of said plug for holding said valve core in said valve bore,

a groove formed in the outer surface of said second part of said plug for receiving the neck of a drain bag therein,

the large diameter end of said valve core being provided with a necked-down portion,

said spring means comprising a flat, resilient spring bent into a polygonal shape conforming to the polygonal shape of said first part of said plug for interference fit therewith, said spring being provided with an aperture of a size large enough to fit over the necked-down end of said valve core but smaller than the large diameter end of said valve core, whereby when the aperture of said spring receives the necked-down end of said valve core and said spring is clamped around said polygonal surface of said plug, said valve core is firmly held in place in said valve bore, and an oil impervious, resilient bag having a neck portion for fitting within said groove for attachment thereto upon removal of said spring from around said plug,

said bag being provided with an aperture in its neck portion for fitting over the necked-down portion of said valve core in an interference fit,

said valve core being suspended by said bag within its interior when said valve core is removed from said valve bore for draining oil from the crankcase.

3,874,479

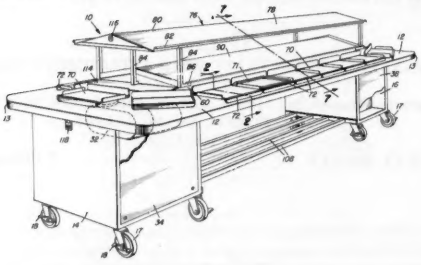
UNITARY FOOD TRAY MAKE-UP CONVEYOR TABLE APPARATUS

Bruno Onori, 4250 N.W. 135th St., and Meredith Luck, both of Opa Locka, Fla., assignors to said Meredith Luck to said Bruno Onori, Opa Locka, Fla.

Filed Nov. 1, 1972, Ser. No. 302,770

Int. Cl. E04h *3/04*

U.S. Cl. 186—1 D **13 Claims**



1. A unitary food tray make-up conveyer apparatus (**10**) comprising a substantially rectangular table (**12**), an endless flexible roller chain conveyor (**24**) operably mounted on said **83.5** (**12**) in an oval path in a single horizontal plane, gear means (**26,28**) engaging said roller chain conveyor (**24**) for operating said conveyor (**24**), power means (**32**) operatively connected to said gear means (**28**), a plurality of spaced pins (**62**) on said chain conveyor (**24**), a plurality of food tray holders (**70**), a pin receiving socket (**66**) on each said tray holder (**70**) cooperating one of said chain conveyor pins (**62**) for pivotally securing one said tray holder (**70**) on said chain conveyor (**24**), an island area (**76,80**) on said table (**12**) within said oval path of said chain conveyor (**24**), means (**78 & 90; 78,100 & 104**) in said island area (**76**) for receiving and supporting a supply of various foods to be selectively taken therefrom by a plurality of attendants and placed on food trays (**71**) removably supported on said tray holders (**70**), said apparatus further comprising a separate cabinet (**14,16**) at the bottom of each end of said apparatus (**10**) providing support for said apparatus (**10**), and temperature controlling means (**92; 104,106**) for at least some of said food receiving and supporting means (**90, 98, 100, 104**).

3,874,480

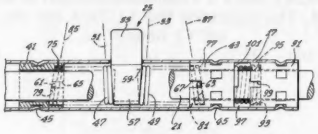
FRICTION BRAKE MECHANISM

Clyde R. Porter, West Los Angeles, and Joseph A. Sember, Glendale, both of Calif., assignors to P. L. Porter Co., Los Angeles, Calif.

Filed Apr. 3, 1972, Ser. No. 240,538

Int. Cl. B65h *59/10*

U.S. Cl. 188—67 **18 Claims**



1. A friction brake for selectively preventing relative axial motion between a cylinder and a rod therein comprising

a pair of springs tightly and oppositely wound upon said rod along intersecting natural helical angle.

a pair of bushings fixed in said cylinder for guidance of the rod therethrough, each having

means therein for fixing one end of one of said springs,

operative means for enlarging the coils of said springs to provide a clearance between them and said rod including

means for enlarging both of said springs simultaneously without substantial alteration of the natural helical angles thereof comprising

actuatable means extending substantially about said rod and having

a spring seat means extending along each side thereof against each of which one of said springs is seated on its natural helical angle and

a spring abutment means adjacent the end of each of said spring seats, and

means closely fitting about said springs and movable with said enlarging means for ensuring the uniform expansion of the coils of the springs throughout the lengths thereof.

3,874,481

AUTOMATIC ADJUSTER FOR A SHOE DRUM BRAKE

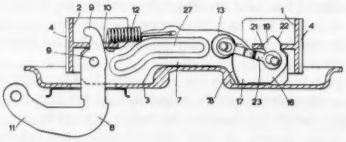
Hugh Grenville Margetts, 7 Derwent Close, Leamington Spa, Warwickshire, England, assignor to Girling Limited, Birmingham, England

Filed Oct. 5, 1973, Ser. No. 404,375

Claims priority, application Great Britain, Oct. 6, 1972, 46357/72

Int. Cl. B16d *65/58*

U.S. Cl. 188—79.5 GT **3 Claims**



1. An automatic adjuster for a shoe-drum brake in which arcuate shoes mounted in a stationary back-plate are adapted to be separated at one end to bring them into engagement with a rotatable drum, and as the shoe linings wear the effective length of a two-part strut extending between the shoes adjacent to their actuated ends is automatically increased to com-

pensate for wear, wherein one part of said strut comprises a bell-crank lever mounted to pivot on a pin passing through a clearance opening in the other part of the strut, a first arm of said lever being received in a slot of limited length in said shoe web and a portion of said arm being formed as a cam which, in the off position of the brake, engages with the radially outer end of said slot to define the off position of the shoe, and a second arm of said lever terminating in an arcuate toothed edge, a peripherally toothed stud is non-rotatably mounted on said other part of the strut, and resilient means are provided for urging said arcuate edge of the second arm of the lever into engagement with said stud.

3,874,482

EDDY CURRENT AND HYSTERESIS BRAKE FOR TRACK BOUND VEHICLES

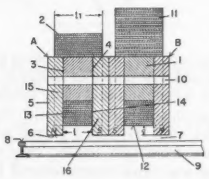
Max Baermann, 506 Bensberg, Bezirk, Cologne, Germany

Filed Dec. 3, 1973, Ser. No. 421,128

Claims priority, application Germany, Aug. 7, 1973, 2340774

Int. Cl. H02k 49/04

U.S. Cl. 188—165 9 Claims



1. An electrically-energized eddy current and hysteresis brake for track bound vehicles comprising: a plurality of electromagnets in aligned relationship parallel to the length of the track, each magnet being comprised of a pair of spaced pole branches extending perpendicularly away from the track, a coil core extending parallel to and spaced from the track and a coil around the core with the direction of winding and interconnections between the individual coils of adjacent magnets being so arranged as to provide alternate magnetic polarity on the pole faces of the electromagnets, the improvement which comprises: the portion of the coil in the space between the pole branches and the track having an axial length substantially less than the axial length of the coil on the sides and portions of the coil core remote from the track.

3,874,483

AUTOMATIC ADJUSTERS FOR VEHICLE BRAKES

Glyn Phillip Reginald Farr, Kenilworth, England, assignor to Girling Limited, Birmingham, England

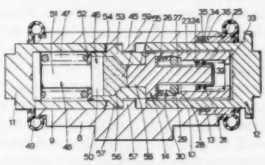
Filed Oct. 19, 1973, Ser. No. 407,844

Claims priority, application United Kingdom, Nov. 9, 1972, 51851/72

Int. Cl. F16d 65/56

U.S. Cl. 188—196 BA 10 Claims

1. An automatic adjuster for a vehicle brake comprising a housing, a screw-threaded strut assembly movable with respect to said housing between an inoperative retracted position and an advanced operative position to transmit a brake applying force to a friction member from brake applying means, abutment means disposed in one datum position for defining said inoperative retracted position, a first part of said adjuster for engagement with said abutment means when said strut assembly is in said inoperative retracted position, a second part of said adjuster spaced from said first part for moving said abutment means from said one datum position to a second datum position when said strut assembly moves from said inoperative retracted position into said operative advanced position through a distance exceeding the spacing between said second part and said abutment means which spacing



defines a desired braking clearance, and adjuster means for increasing automatically the effective length of said strut assembly to compensate for wear of said friction member after said abutment has moved to said second datum position.

3,874,484

RESETTING DEVICE FOR BRAKES

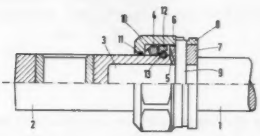
Gyula Nadas, Eching; Bernd Wosegien, Munich, both of Germany, assignors to Knorr-Bremse GmbH, Munich, Germany

Filed Nov. 19, 1973, Ser. No. 416,770

Claims priority, application Germany, Nov. 17, 1972, 2256431

Int. Cl. F16d 65/50

U.S. Cl. 188—197 2 Claims



1. In a device for resetting an automatic adjusting device on a brake rod linkage for railway vehicles and the like, the combination of an adjustable rod, a brake rod linkage connecting head rotatably coupled to said rod coaxially therewith and axially moveable with respect thereto, mutually engageable serrations on said rod and head, a cap mounted on said rod and extending over the end of said head, spring means within said cap between a portion thereof and said head for urging said serrations into mutual engagement, a disc attached to said rod and having said rod serrations thereon, said cap being mounted on said disc, and a pin passing transversely through said cap, disc and rod to secure the cap and disc onto the rod.

3,874,485

OLEO-PNEUMATIC SHOCK ABSORBER

George O. Smith, Ferndale, Mich., assignor to General Motors Corporation, Detroit, Mich.

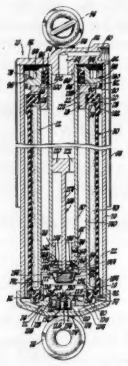
Division of Ser. No. 249,612, May 1, 1972, Pat. No. 3,798,744. This application Oct. 23, 1973, Ser. No. 408,677

Int. Cl. F16f 9/08

U.S. Cl. 188—298 4 Claims

1. A combination gas and liquid suspension device for a vehicle comprising a liquid filled inner cuylinder having opposite open ends, each end having a radially extending annular flange, a rod guide member connected in one end of the inner cylinder, base valve means connected in the opposite end of said inner cylinder, a piston slidably supported within said inner cylinder for opposite reciprocation therein, a piston rod connected to said piston having one end thereof extending through said rod guide member exteriorly of said inner cylin-

der, a flexible sleeve bladder located coaxially of the inner cylinder in spaced relationship to the outer surface thereof to form a gas space, said bladder having ring-like opposite end portions extending radially inwardly therefrom to provide gas seals for said bladder, one of said end portions of said bladder being operatively positioned between one of said flanges of said inner cylinder and said rod guide means to seal one end of said gas space, the other of said end portions being operatively positioned between the other of said flanges of said inner cylinder and said base valve means to seal the other end of said gas space, an outer cylinder member located coaxially of and in surrounding relationship with said bladder, means closing one end of said outer cylinder and including means thereon cooperating with said base valve means to define an



oil path from the inner cylinder to a reservoir space between the bladder and the outer cylinder, said outer cylinder having an opposite open end therein, an end cap adjustably mounted in and closing the opposite open end, first seal means operatively connected between said end cap and the outer cylinder to form a pressure seal at the outer cylinder, second seal means on the end cap for forming a pressure seal between it and the reciprocating piston rod, and adjustable means for positioning and locking said end cap in said outer cylinder to locate said first and second seals in sealing relationship with said outer cylinder and said piston rod and to hold said end portions of said bladder in sealing relationship with said annular flanges of said inner cylinder, said rod guide and said base valve means.

3,874,486

SHOCK ABSORBER AND SUSPENSION STRUT

Teiji Katsumori; Yoshisuke Ohsaka, both of Yokohama, and Tetuo Kato, Kawasaki, all of Japan, assignors to Tokico Ltd., Kawasaki, Japan

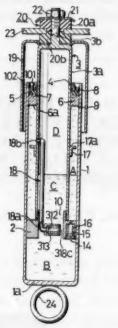
Continuation of Ser. No. 213,379, Dec. 29, 1971, abandoned. This application Oct. 4, 1973, Ser. No. 403,353

Claims priority, application Japan, Dec. 29, 1970, 45-126611; Apr. 19, 1971, 46-24739

Int. Cl. F16d *9/06*

U.S. Cl. 188—314 **1 Claim**

1. A vibration damper mechanism comprising a cylinder having a predetermined quantity of hydraulic fluid sealed therein, an annular piston slidably mounted in the interior of said cylinder for dividing said cylinder into first and second variable volume chambers, a hollow piston rod having an open end secured to said annular piston and passing outwardly from said cylinder through said first chamber, stop means on said piston rod to limit outward movement of said piston rod from said cylinder, guide means for guiding said rod in sealed sliding engagement with an aperture in one end of said cylinder, the other end of said piston rod being closed to define a hydraulic fluid receiving chamber adjacent said open end and a gas chamber adjacent said other end, said hydraulic fluid receiving chamber in said hollow piston rod being disposed in permanent communication with said second chamber through the central opening in said annular piston to define a unified hydraulic fluid pressure chamber, a fluid flow limiting conduit means secured to said hollow piston rod and having an inlet



end and an outlet end, said inlet end being disposed in communication with said first chamber adjacent said stop means between said stop means and said guide means and said outlet end being disposed in communication with the interior of said hollow piston rod, one way valve means for permitting restricted fluid flow from said unified chamber to said first chamber and one-way valve means secured to the outlet end of said conduit means to permit fluid passage from said first chamber to the interior of said hollow piston rod.

3,874,487

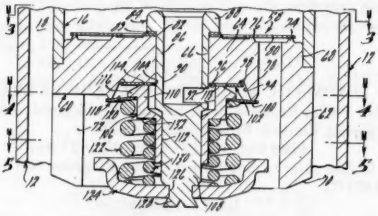
SHOCK ABSORBER

Johan H. Keijzer; Johan V. van den Berg, both of Hasselt; Jan M. A. Wijnhoven; Louis J. Jossa, and August G. L. Moonen, all of Sint-Truiden, all of Belgium, assignors to Monroe Belgium N.V., Sint-Truiden, Belgium

Filed June 14, 1973, Ser. No. 370,021

Int. Cl. F16f *9/34*

U.S. Cl. 188—322 **20 Claims**



1. A compression valve for a shock absorber including a pressure cylinder having a reciprocable piston therein and a reserve tube arranged concentrically of the pressure cylinder and defining a fluid reservoir therewith,

said valve including a base member disposed adjacent one end of said pressure cylinder,

said base member comprising first and second passage means communicating said reservoir with said pressure cylinder,

means defining first and second valve seats on said base member,

a first annular valve disc adjacent one side of said base member and having a deformable peripheral portion movable toward and away from engagement with said first valve seat to selectively block fluid flow from said pressure cylinder to said reservoir through said first passage means,

a second annular valve disc concentrically arranged relative to said first disc and disposed adjacent the opposite side of said base member and movable toward and away from engagement with said second valve seat to selectively block fluid flow from said reservoir to said pressure cylinder, axially movable support means supporting said second valve disc and being movable axially therewith toward and away from said second valve seat,

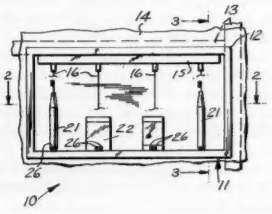
a pair of cooperable spring elements yieldably urging said means supporting said second valve disc toward a position wherein said second valve disc is engaged with said second valve seat, with one of said spring elements being deformable to permit only a peripheral portion of said second valve disc to move away from said second valve seat under the influence of a first magnitude of fluid pressure in said pressure cylinder, and with both of said spring elements being deformable to permit said second valve disc and said means supporting the same to move axially away from said second valve seat under the influence of a second magnitude of fluid pressure in said pressure cylinder.

3,874,488

ELECTRIC CORD RETRIEVING DEVICE

Robert Benson Wirth, 117 W. Main St., Woodland, Calif. 95695

Filed Apr. 25, 1973, Ser. No. 354,239
Int. Cl. H02g *11/00*
U.S. Cl. 191—12 R **4 Claims**



1. An electric cord retrieving device, comprising a hollow rectangular configurated box for receiving the appliances, a cord receiving receptacle carried within said box for plugingly carrying a plurality of cords of said appliances, a pulley and a weight carried by said cords of said appliances for gravity feeding said cords downwards below said box, a plurality of spaced apart and parallel fingers carried by said box for rendering said cord stationary when said appliances are removed from said box for use, said box being provided with an outwardly extending flange for abutting with the walls said box is mounted in, said box being secured to the studs of said wall by suitable fasteners and the opened face of said box freely receiving any one of said appliances when desired.

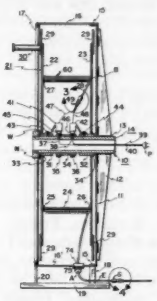
3,874,489

GLASS ROD AND REEL CONSTRUCTION

Don C. Christensen, Granger, Utah, assignor to George E. Baumann, Salt Lake City, Utah, a part interest

Filed July 13, 1973, Ser. No. 379,165
Int. Cl. H01r *39/00*
U.S. Cl. 191—12.2 R **6 Claims**

1. A reel construction including, in combination, a support frame having a horizontal, fixed, hollow shaft; a reel; bearing means journalling said reel to said fixed shaft; a handle eccentrically connected to said reel; a flexible glass-rod type elongate member wrapped upon said reel and having a connection



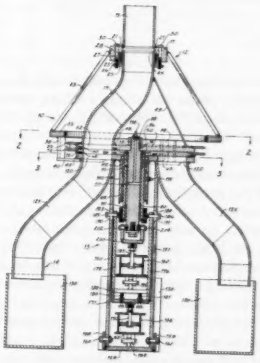
end passing inwardly through said reel to be disposed in the interior thereof; and means proceeding axially through and then radially through said shaft for connecting to said flexible elongate member at a region within said reel.

3,874,490

PNEUMATIC MULTI-STATION REMOTE CONTROLLED SWITCHING STATION

Isaac N. McAlister, Sylacauga, Ala., assignor to The Georgia Marble Company, Atlanta, Ga.

Filed Feb. 20, 1974, Ser. No. 444,025
Int. Cl. B65g *11/00*
U.S. Cl. 193—23 **11 Claims**



1. A station for connecting an input chute to a selected one of a plurality of output chutes, comprising:

an input chute having a discharge end and a plurality of output chutes,

a first rotatable plate connected to said input chute, said plate having an aperture in sealed registration with said discharge end of said input chute,

means for rotating said first plate,

a second rotatable plate lying in concentric relation with said first plate and having an aperture therein adapted to be in sealed registration with said aperture of said first plate,

means connected to said second plate for rotating said second plate,

a fixed outside flange plate having a plurality of openings, each of said openings being the input end of one of said plurality of output chutes,

means connected to said first and second plates for axial movement thereof away from each other and from said outside flange plate to align said apertures of said first and second plate with said opening in said outside flange plate,

said last named means adapted to axially move said first and second plates into sealed contact with each other and with said outside flange plate.

3,874,491

OMNIDIRECTIONAL ROLLER ASSEMBLY

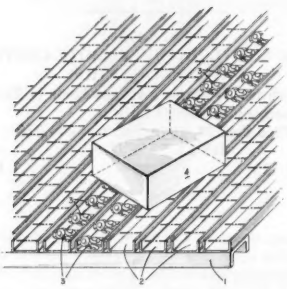
Jean-Jacques Faure, Versailles, France, assignor to L'Etat Francais Delegation Ministerielle pour l'Armement Direction Technique des Armements Terrestres, Paris, France

Filed Jan. 18, 1972, Ser. No. 218,739

Claims priority, application France, Jan. 18, 1971, 71.01516

Int. Cl. B65g *13/00, 13/06*

U.S. Cl. 193—35 MD **5 Claims**



1. An omnidirectional roller assembly which enables relative movement of a plane surface in contact therewith in any optional direction in or parallel to the palne of contact of said surface and assembly, said roller assembly comprising: a support member; a main body member; a shaft and bearing means mounting said main body member on said support member for rotation about the longitudinal axis of said main body member; and a plurality of substantially identical rotary members rotatably mounted on said main body member, each rotary member having a bearing surface for contacting said plane surface, said bearing surface being a portion of an imaginary sphere centered on the intersection of the axes of rotation of the rotary member and said main body member, said portion of said sphere being defined between two spaced apart planes substantially perpendicular to the axis of rotation of said rotary member and cutting said sphere; wherein said rotary members are arranged in at least two adjacent groups on said main body member, each group comprising the same number of rotary members, and wherein within each group the axes of rotation of said rotary members are all coincident at the axis of rotation of said main body member, the axes of rotation of the rotary members in any given group being spaced from each other at substantially equal angular intervals about the axis of rotation of said main body member; the spherical radius of the bearing surfaces of each rotary means of each group being such that, in an imaginary circular cylindrical surface having a radius equal to the spherical radius of said bearing surfaces and having its axis coincident with the rotational axis of said main body member, substantially any straight line in the cylindrical surface lying parallel to the axis of the cylindrical surface is tangential to at least one of said bearing surfaces.

3,874,492

LINE-WRITING APPARATUS WITH PLURAL PRINT HEADS IN PARALLEL ROWS

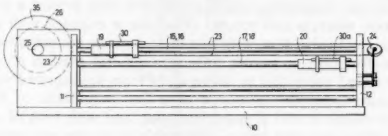
Kurt Hurst, Stuttgart, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed May 11, 1973, Ser. No. 359,559

Claims priority, application Germany, May 31, 1972, 2226394

Int. Cl. B41j *3/54*

U.S. Cl. 197—1 R **12 Claims**



1. In an apparatus for producing consecutive parallel lines of indicia on a major surface of an elongated strip-shaped record carrier having edges extending in the longitudinal direction of the record carrier, a combination comprising two scribing units; means mounting said scribing units so that one of said scribing units is permanently spaced from the other one in said longitudinal direction of record carrier by a distance corresponding to the spacing between two consecutive lines of indicia to be produced, said mounting means being elongated and extending transversely of the record carrier and parallel to the major surface thereof, said scribing units being mounted on said mounting means for displacement longitudinally thereof between a first end position adjacent one of the edges of the record carrier and a second end position adjacent the other edge; drive means for displacing one of said scribing units between said first and second end positions thereof and for simultaneously displacing the other scribing unit between said second and first end positions thereof, and vice versa, while said scribing units are always spaced by said distance in said longitudinal direction of the record carrier; means for actuating said scribing units so as to produce a respective line of indicia at least during the displacement of the respective scribing unit between said first and second end positions thereof; and means for effecting intermittent relative displacement between the record carrier and said mounting means in said longitudinal direction of the record carrier.

3,874,493

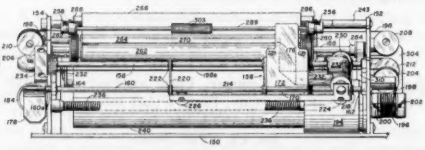
ELECTRONIC PAGE PRINTER

Alfred Kent Boyd, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 303,915, Nov. 6, 1972, abandoned, which is a continuation of Ser. No. 161,983, July 12, 1971, abandoned, which is a continuation of Ser. No. 788,137, Dec. 31, 1968, abandoned. This application Dec. 13, 1973, Ser. No. 424,513

Int. Cl. B41j *1/24*

U.S. Cl. 197—1 R **9 Claims**



1. An electronic page printer for printing on a sheet of recording medium, comprising:

a. an electronic thermal printhead, said thermal printhead having a support chip and a character matrix of semiconductor elements mounted on said support chip in thermally separated relationship for printing characters on the sheet of recording medium,
b. stationary means for supporting the sheet of recording medium in front of the printing surface of the electronic printhead,
c. means for moving said electronic printhead to a plurality of printing positions across the width of said sheet of recording medium, and
d. engagement means for moving said sheet of recording medium into engagement with said electronic printhead, said engagement means including a moveable member having a flat resilient pressure pad for moving a selected portion of the sheet of recording medium into contact with the said electronic printhead, said pressure pad comprising a thin, hard metal plate connected to said moveable member by a resilient block, for providing uniform contact of said printhead against said recording medium.

3,874,494

EQUIPMENT FOR HANDLING ROLLABLE ARTICLES

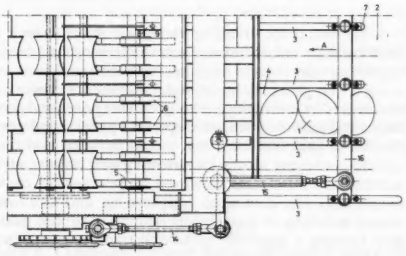
Leonardus Johannes Temming, Elisiusstraat 90, Aalten, Netherlands, assignor to Staalkat B.V., Netherlands

Continuation of Ser. No. 114,173, Feb. 10, 1971, abandoned. This application Feb. 28, 1973, Ser. No. 336,803

Claims priority, application Netherlands, Feb. 2, 1970, 7001859

Int. Cl. B65g *47/26*

U.S. Cl. 198—30 **2 Claims**



1. Apparatus for delivering rollable articles, such as eggs, said apparatus including means for spacing and intermittently removing said articles and for delivering said articles to means further acting thereon, said spacing means including an automatic loader of the type having a rotating transport roller which transports individual articles in cavities in the roller, a feed conveyor having a receiving end for receiving the articles in random fashion and a delivery end for delivering articles to the cavities of the transporting roller, a plurality of vertical partitions extending in the direction of article transport so as to have upstream and downstream ends, said partitions being disposed above the delivery end of said conveyor and being horizontally spaced apart in side-by-side essentially parallel relationship to define a plurality of channels, each of which has a width such that only a single row of articles will be transported therethrough so that each channel delivers its respective row of articles to a given location on the transporting roller, means mounting each partition for pivotal movement about a separate vertical axis at its downstream end so that the upstream ends of the partitions are capable of performing a transverse reciprocating movement relative to said conveyor; means for imparting continuous reciprocating pivotal movement to said partitions such that the upstream ends of said partitions move through a small distance which is much less than the width of the channels thereby preventing jamming of the randomly disposed articles as they enter the channels; and means for preventing said rollable articles from moving more than a small amount upwardly off said conveyor while they are temporarily retained at the delivery end of each channel before removal by said transport roller and without necessarily retarding forward movement thereof, said means comprising at least two resilient vertically adjustable hold-down elements arranged over the delivery end of each channel at different heights and each inclined downwardly in the direction of transport from a fixed end thereof, the upper one of said elements terminating in a free end beyond the free end of the lower one in the direction of transport, the free ends of said hold-down elements being horizontally spaced from each other in the direction of transport by a distance approximately equal to the average dimension of the articles to prevent an upward movement of an article.

3,874,495

TRANSPORT DEVICE

Kate Kemper, Wybuelstrasse 6, Zurich-Zollikon, Switzerland (CH-8702)

Filed Jan. 22, 1973, Ser. No. 325,340

Claims priority, application Germany, Oct. 9, 1972, 2249383

Int. Cl. B65g *17/00*

U.S. Cl. 198—137 **13 Claims**

1. A transport device, for use with a dough dividing and circular kneading device, a dough rolling-out station spaced from the dividing and kneading device, and means carrying kneaded dough pieces from the dividing and kneading device to the rolling-out station, said transport device comprising, in combination, an endless conveyor extending between said station and said kneading device; carrier elements on said conveyor, tiltable about respective pivot axes spaced longitudinally of said conveyor and extending transversely of the direction of movement of said conveyor, arranged to receive rolled-out dough pieces at said rolling-out station; control guide means operatively engaged with said carrier elements and normally maintaining the latter in dough-piece receiving orientation, a portion of said control guide means being displaceable vertically, while remaining engaged with said carrier elements, to tilt said carrier elements to discharge the rolled-out dough pieces onto a carrier and to return said carrier elements to their dough-piece receiving orientation; and release means operable, each time a selected number of filled carrier elements is aligned with a carrier to displace said control guide means portion vertically to so tilt said selected number of filled carrier elements simultaneously to discharge the dough-pieces therefrom and to return said selected number of carrier elements to their dough-piece receiving orientation.

3,874,496

GARMENT STORAGE RACK

Ted Bodin, Miami Beach, Fla., assignor to Bodin Apparel, Inc., Hialeah, Fla.

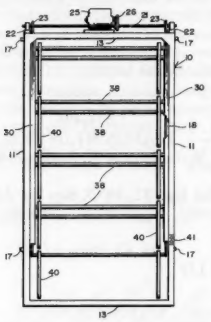
Filed Nov. 9, 1973, Ser. No. 414,530

Int. Cl. B65g *15/00*

U.S. Cl. 198—158 **1 Claim**

1. A garment storage rack comprising a substantially rectangular frame structure extending vertically, a plurality of sprocket gears rotatably mounted on opposite sides of said frame structure forming two sets of gears, an endless chain engaging each set of said gears, a pair of channel members

mounted vertically on said opposite sides receiving and forming a guide for said chains, a plurality of rods extending between said opposite sides secured at their ends to said endless chain, a pipe for supporting garments rotatably mounted on each of said rods, a panel secured at each end of said pipes and extending downwardly therefrom, whereby said panels remain upright throughout the travel of said rods about said rack, an idler gear mounted on each of said sides engaging said enless chains for rendering said chains in a taut condition and power operated means mounted on said rack and engaging said chains for the simultaneous movement of said endless chains



and said garment carrying pipes, said power operated means comprising a motor having a shaft mounted on said frame structure, a gear mounted on said motor shaft, a further rod extending between said opposite sides above said frame structure a further sprocket gear mounted on the ends of said further rod, second sprocket gears secured to a pair of oppositely positioned first named sprocket gears, endless chains engaging said second sprocket gears with said further sprocket gears, a third sprocket gear mounted on said further rod at substantially the mid-portion thereof whereby upon the actuation of said motor all of said sprocket gears and said endless chains rotate substantially simultaneously.

3,874,497

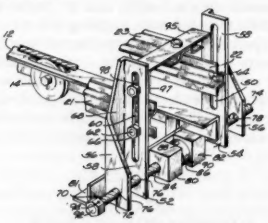
SANITARY SIDE GUIDE RAIL FOR CONVEYOR

Kenneth G. Carlson, 11350 N. Valley Dr., 18 W., Mequon, Wis. 53092

Continuation-in-part of Ser. No. 161,839, July 12, 1971, abandoned. This application July 2, 1973, Ser. No. 375,410

Int. Cl. B65g *15/60*

U.S. Cl. 198—204 **5 Claims**



1. A guide rail construction for an empty can conveyor or the like comprising at least two guide rails having two parts, both of said parts having first and second spaced co-planar flanges, a web portion located intermediate said first and second flanges and offset from said flanges and inwardly converging wall portions connecting said web portion with said flanges and defining a channel, one of said parts having first and second spaced flanges, said web portion and said flanges being offset laterally from the other of said parts at an end of said guide rails a distance sufficient to receive the end of an adjoining guide rail so that the flanges of both of said adjoining guide rails are co-planar and provide a substantially continuous vertical guiding surface, means for connecting said overlapped ends of said adjoining guide rails, and means for supporting said guide rails with the co-planar flanges in a generally vertical orientation.

3,874,498

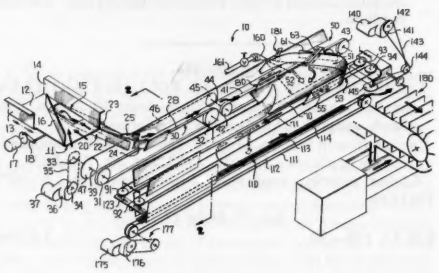
APPARATUS FOR AND METHOD OF ORIENTING ARTICLES HAVING AT LEAST ONE TAPERED END

Paul F. Cover, Westminster; John W. Rife, Severna Park, and Clyde F. Kemper, Westminster, all of Md., assignors to The United Company, Westminster, Md.

Filed July 20, 1972, Ser. No. 273,405

Int. Cl. B65g *47/00*

U.S. Cl. 198—254 **39 Claims**



3. Apparatus for orienting elongated objects which are at least partially tapered at one end comprising first means for conveying said objects randomly with different ends leading along a first generally horizontal path in a first direction second means for conveying said objects along a second generally horizontal path in a second direction opposite and generally parallel to said first direction, means between said first and second conveying means for orienting said objects such that substantially all objects conveyed by said second conveying means have like contoured ends leading, and said orienting means including at least means defining a curved guide surface forming a generally horizontal transition path between said first and second paths.

3,874,499

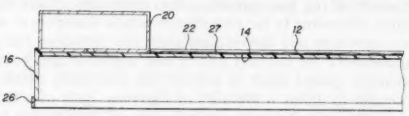
ARTIST'S PALETTE

Roy C. Barnett, Jr., 2416 McKinney, Dallas, Tex. 75201

Filed Sept. 12, 1973, Ser. No. 396,489

Int. Cl. B44d *3/02*

U.S. Cl. 206—1.7 **11 Claims**

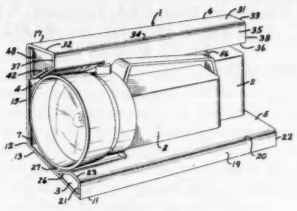


1. An artist's palette for water-based colors comprising:

a. a palette base member having an upper finely textured surface for receiving a water coating; and

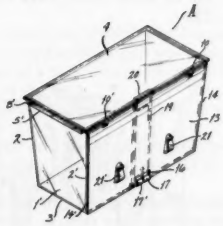
b. a thin water permeable liner for covering said finely textured surface of said palette base member comprising a lower water absorbent surface for contacting said finely textured surface and an upper water-permeable pigment-impermeable surface for receiving water-based artist's colors thereon.

3,874,500
DISPLAY PACKAGE
Thomas H. Nicholl, 1204 W. 27th St., Kansas City, Mo. 64108
Filed July 3, 1973, Ser. No. 376,147
Int. Cl. B65d *5/44, 5/48*
U.S. Cl. 206—45.19 **7 Claims**



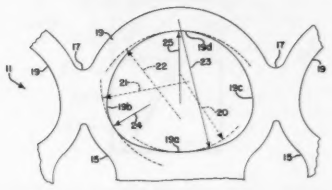
1. A display package comprising:
a. a base wall and a rear wall extending upwardly from said base wall;
b. shelf means spaced from and supported on said base wall for supporting merchandise thereon;
c. merchandise engaging means extending from said rear wall for retaining merchandise on said shelf means;
d. means extending between said shelf means and said merchandise engaging means for supporting said merchandise engaging means in spaced relation with said shelf means;
e. said means for supporting said merchandise engaging means comprises:
1. a support panel extending vertically from said shelf means and positioned adjacent said rear wall, said support panel having a lower edge in engagement with said base wall and an upper edge in engagement with said merchandise engaging means; and
2. a partition extending substantially normal to said support panel and having a lower edge in engagement with said base wall and an upper tab received in said merchandise engaging means.

3,874,501
CARD HOLDER
Richard B. Cronheim, 7 Upper Barnes, St. Louis County, Mo. 63124
Filed Aug. 29, 1973, Ser. No. 392,620
Int. Cl. B65d *1/36;* **B42f** *17/06*
U.S. Cl. 206—73 **10 Claims**



1. A card holder comprising a container having a bottom wall, a pair of front and rear side walls, and a pair of end walls, said container being normally open to the top, a closure provided for said normally open top of said container, means slidably mounting said closure on said container end walls for movement in a plane parallel to the bottom wall between container-open and container-closed condition, said closure having a portion projecting beyond said rear side wall when said closure is in container-closed condition, and a support plate hingedly engaged to said closure in its rearward projecting portion, said support plate being presented rearwardly of said rear side wall and being swingable in a vertical plane.

3,874,502
MULTIPLE CONTAINER CARRIER AND PACKAGE
William N. Weaver, Glen Ellyn, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.
Filed Mar. 2, 1973, Ser. No. 337,505
Int. Cl. B65d *75/00*
U.S. Cl. 206—150 **13 Claims**



1. A multiple container carrier for a plurality of pairs of cylindrical containers, said carrier comprising a plurality of pairs of bands, a web interconnecting the outer marginal edges on one side of each of the bands of each pair of bands, a second web interconnecting the outer marginal edges on one side of each of the bands of adjacent pairs of said bands, said bands and said webs being formed from a resilient deformable plastic sheet material with said bands and said webs lying in the plane of said sheet material, the inner peripheral margin of each of said bands being uninterrupted and shaped to define a closed loop of four arcuate sections, said first arcuate section being contiguous to said first web and said one side of each of said bands and having a radius of curvature substantially greater than the radius of said containers, the second and third arcuate sections extending from each end of said first arcuate section and being contiguous to said second web, said second and third arcuate sections having substantially the same radius of curvature, the radius of curvature of said second and third arcuate sections being substantially less than the radius of said containers, the fourth arcuate section extending between said second and third arcuate sections and having a radius of curvature no greater than the radius of said containers, the total arcuate extent of said four arcuate sections being substantially less than the circumferential dimension of said containers, the distance between the end connections of said first webs to said bands being greater than the length of a straight line extending between the ends of said first arcuate section and less than the diameter of said cylindrical containers, and the distance between the end connections of said second webs to said bands being substantially less than the length of a straight line drawn between the points of widest spacing on the inner peripheral margin of said first and fourth arcuate sections.

3,874,503
DEVICE FOR HOUSING AND RETAINING SMALL VOLUMES OF GELLED MEDIA
George Raymond Shaffer, Towson, Md., and Warren Jene Russell, Lincoln, Mass., assignors to Becton Dickinson and Company, East Rutherford, N.J.
Filed Jan. 4, 1973, Ser. No. 320,883
Int. Cl. B65d *81/24*
U.S. Cl. 206—205 **18 Claims**

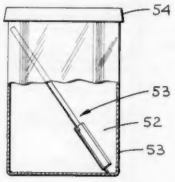
1. A device for housing and retaining small volumes of nutrient gelled media which is adapted for culturing microorganisms comprising:

an elongated rigid plastic member having a handle portion at one end and an enlarged substantially rectangular head portion at the other end;

the head portion having surfaces thereon forming retention means adapted to receive and maintain in fixed position thereon small volumes of nutrient gelled media;

a container having an open end and having an interior diameter slightly greater than the width of the head portion and a length greater than the member so that the member is removably positioned in the container;

a closure removably mounted on the open end of the container to maintain the member in sterile condition prior to use;



the head portion having a peripheral rim and a central rib bisecting the head and connected to the peripheral rim so that a pair of adjacent chambers are formed in the head adapted and positioned to accept separate volumes of nutrient gelled media;

the head being open on one side thereof to provide access to the chambers therein;

the bisecting rib on the head having a raised divider rim projecting upwardly therefrom along its length to facilitate separation of the two chambers and alleviate the danger of intermixing the media in each chamber; and

the member being of a clear plastic material.

3,874,504

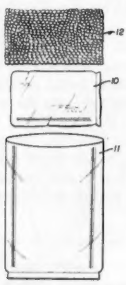
CHEMICAL THERMAL PACK

John P. Verakas, 3210 Industrial 33rd St., Fort Pierce, Fla. 33450

Continuation-in-part of Ser. No. 201,147, Nov. 22, 1971, abandoned. This application May 24, 1973, Ser. No. 363,547

Int. Cl. B65d *79/00*

U.S. Cl. 206—219 **6 Claims**



1. In a chemical thermal pack having a flexible, liquid-tight outer pouch, a liquid solvent and particulate material which produces heat or absorbs heat when contacted by said liquid solvent, and a liquid-proof inner bag filled with said liquid solvent and separating it from said particulate material, said inner bag being readily rupturable by said liquid solvent when squeezed manually, the improvement which comprises:

a flexible, liquid-tight intermediate envelope containing said particulate material and the solvent-filled inner bag, said intermediate envelope being slidably received snugly in said outer pouch and being substantially nonrupturable when squeezed manually;

and a thin, flexible sheet of heat insulation material slidably received in said pouch between one side of the pouch and said intermediate envelope.

3,874,505

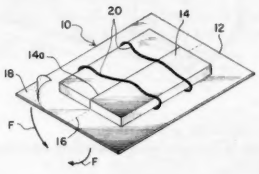
WALL CREVICE REPAIR KIT

Carl Mirarchi, 7 Dorchester Rd., Smithtown, N.Y. 11788, and Albert Mauceri, 69 Bretton Rd., Hauppage, N.Y. 11787

Filed Aug. 2, 1973, Ser. No. 384,872

Int. Cl. E04g *23/02*

U.S. Cl. 206—223 **3 Claims**



1. A wallboard kit for repairing an opening in a wallboard surface comprising:

a template having an area larger than the opening to be repaired;

a preformed sheet rock patch identical in size to said template;

a rigid backboard secured to said patch, said backboard being larger than said patch so as to define a border between the periphery of the patch and the edges of the backboard;

an adhesive for disposal on the border of said backboard;

at least one string connected to said patch; and

plaster material for sealing the patch to the wallboard, so that after the wallboard opening is circumscribed by said template and cut out, said patch and backboard are inserted through the opening and pulled into place by said at least one string to permit the adhesive on the border to engage the wallboard, and thereby permit the plaster to seal the patch to the surface of the wallboard.

3,874,506

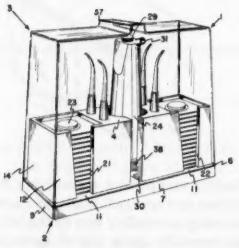
ARTICLE DISPLAY AND STORAGE STRUCTURE

David E. Hill, Gardner, and Jack Briar, Shawnee Mission, both of Kans., assignors to Allied Industries of Kansas, Inc., Edgerton, Kans.

Filed Oct. 24, 1972, Ser. No. 299,795

Int. Cl. B65d *79/00*; **A61h** *9/00*

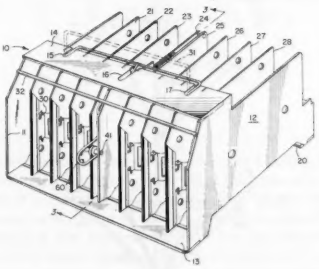
U.S. Cl. 206—229 **4 Claims**



1. A display and storage structure for a liquid discharge apparatus comprising:

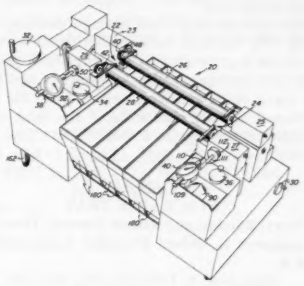
a. a base portion;
b. walls extending from said base portion and arranged to define sides and a bottom of a plurality of compartments, one of said compartments being adapted to receive for storage therein a liquid discharge apparatus having a liquid chamber therein and one end with a removable end portion for filling of said chamber and the other end with a discharge nozzle extending generally laterally outward therefrom, said walls terminating in an upper deck;
c. one of the walls defining the bottom of said one compartment for supporting engagement of said one end of the liquid discharge apparatus with said discharge nozzle thereof above said upper deck;
d. said one wall defining the bottom of said one compartment having a portion with downwardly recessed surfaces for supporting engagement with the other end of said liquid discharge apparatus, said recessed surfaces cooperating with the compartment sides thereabove in holding said liquid discharge apparatus inverted in the compartment in chamber filling position with the removable end portion upwardly and above the upper deck;
e. one of the walls defining a side of said one compartment having a passage therethrough for receiving the nozzle when the discharge apparatus is supported in inverted position in said one compartment.

3,874,507
CARTRIDGE CARD TRAY
John H. Lanahan, Whitesboro, N.Y., assignor to GAF Corporation, New York, N.Y.
Filed Dec. 12, 1973, Ser. No. 423,907
Int. Cl. B07c *1/20*
U.S. Cl. 209—80.5 **22 Claims**



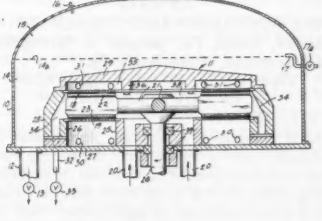
1. A card tray for carrying a pack of information cards both in storage and in a card sorting apparatus comprising:
a bottom including a bottom support means for supporting the bottoms of the cards,
side support means connected to the bottom support means, and,
rear stop means, also connected to the bottom support means, for limiting rearward movement of the cards into the tray,
the front end of the tray being opened to permit the insertion and removal of cards into and from the tray,
said bottom support means including a front platform and a rear platform, both of said platforms extending across the bottom front and rear of the tray, respectively, and positioned to support, respectively, the front and rear of the bottoms of the cards, the bottom being opened between the front and rear platforms to provide a space beneath all of the cards large enough to receive therein the code bars of a card sorting apparatus.

3,874,508
CLASSIFYING MACHINE
Walter I. Cronan, Palisades Park, N.J., assignor to Volume Products Company, Inc., Garfield, N.J.
Filed Mar. 26, 1974, Ser. No. 454,978
Int. Cl. B07b *13/04*
U.S. Cl. 209—107 **32 Claims**



1. In a classifying machine for sizing articles and separating the articles so sized in a predetermined pattern having a feed end and a discharge end, a pair of rollers higher at the feed end than at the discharge end and spaced with respect to each other, and drive means for rotating the rollers in opposite directions, the improvement comprising:
four pairs of bearings mounted at the ends of the rollers to support the rollers at the ends, each such pair supporting one end of one of said rollers;
the bearings of each pair being mounted in intersecting planes to thereby bear against the outer surface of the roller associated with the said pair of bearings such that the forces applied by the bearings are in a direction toward the other roller;
a pair of drive gears mounted at the feed end, there being one drive gear associated with each roller;
and a driven gear mounted on the feed end of each roller engaging the associated drive gear;
the drive gears being rotated by the drive means so that the rollers are rotated in opposite directions and are urged outwardly toward the pairs of bearings.

3,874,509
PRESSURE SCREEN AND SURGE TANK
Joseph D. Parker, deceased, late of Roscoe, Ill. (by Dorothy C. Parker, executrix); Shu Tang Han, South Beloit, and Richard E. Hergert, Rockton, both of Ill., assignors to Beloit Corporation, Beloit, Wis.
Filed Nov. 6, 1972, Ser. No. 303,935
Int. Cl. B07b *1/04*
U.S. Cl. 209—240 **11 Claims**



1. A paper machine screen mechanism comprising in combination:

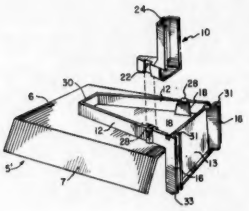
a cylindrical stock surge tank containing screened stock upper pressure and having an air dome for maintaining pressure within the tank;
a screened stock outlet leading from the surge tank with valve means for controlling the flow of stock through said outlet;
means for directing air under pressure into the dome for coacting with the valve means for controlling the pressure in said surge tank;
a screen within the surge tank having a discharge communicating with the surge tank so that the flow rate through the screen is controlled by the surge tank pressure;
a stock inlet feeding radially outwardly to said screen;
and a reject outlet receiving rejects from the screen and positioned radially outwardly of the inlet and radially inwardly of the surge tank outlet.

3,874,510

STACKABLE TRAY

Gordon Perry, Bayside, and Robert Schmidt, Freeport, both of N.Y., assignors to Oxford Pendaflex Corporation, Garden City, N.Y.

Filed Nov. 1, 1973, Ser. No. 411,638
Int. Cl. A47f *3/14*
U.S. Cl. 211—126 **2 Claims**



1. A stackable tray assembly comprising:
at least two vertically adjacent trays designated an uppermost tray and a lowermost tray, each of said trays including a bottom wall; and
at least one generally L-shaped bracket, said bracket being detachably fastened solely to said adjacent trays;
at least one extruded shoulder extending downwardly from the underside of the bottom wall of each of said trays, said shoulder of the lowermost tray being formed so as to serve as a base for the said tray;
at least one dovetailed guide appended to said shoulder of the uppermost tray; said bracket having at least one dovetailed channel to cooperate with said dovetailed guide;
a tab located at the base of said supporting bracket, said tab extending downwardly; the upper surface of the bottom wall of the lowermost tray having a recess to cooperate with said tab.

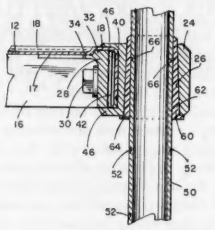
3,874,511

SHELVING WITH REMOVABLE CORNER STRUCTURES

Louis Maslow, Dallas, Pa., assignor to Metropolitan Wire Goods Corporation, Wilkes-Barre, Pa.

Filed June 13, 1973, Ser. No. 369,523
Int. Cl. A47b *96/02*; **A47f** *5/10*
U.S. Cl. 211—153 **7 Claims**

1. A shelf comprising a generally rectangular one piece planar member having downwardly depending corner portions, said corner portions at each corner being disposed in a plane substantially normal to the plane defined by said planar member; corner connectors at each corner, each connector comprising a corner structure disposed on one side of a respective corner portion and a clamping bar disposed on the opposing side of the respective corner portion, at least one of said corner structure and clamping bar being provided with a recess dimensioned to receive a corner portion when the latter is clamped between an associated corner structure and clamping bar, the surfaces of said corner structure and clamping bar being substantially complementary to each other; and fastening means for maintaining each corner structure and associated clamping bar in abutment against each other and against a respective corner portion with the latter being received within the respective recess, said corner structures further being provided with means for mounting the same on a shelf support post, whereby each corner connector forms a substantially closed crevice-free structure which houses a corner portion.

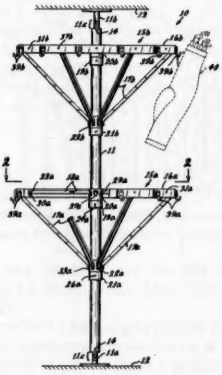


3,874,512

MULTI-SIDED STORAGE RACK FOR SKIS OR SIMILAR ARTICLES

Jack H. Wegley, 1805 Forest, Boulder, Colo. 80302, and John C. Foraker, 485 Oneida, Boulder, Colo. 80303

Filed Aug. 23, 1973, Ser. No. 391,037
Int. Cl. A47f *5/02*
U.S. Cl. 211—163 **4 Claims**



1. A carousel type rack comprising:
a vertically disposed post; and
upper and lower frame members projecting radially outwardly from said post, said pair of frame members being rotably mounted on said post and each of said frame members comprising:
a hub rotatably received upon said post;
a polygonal outer web coaxial with said post;
a plurality of radially extending spokes integral with said hub and extending from said hub to the midpoints of the sides of said polygonal member and integrally jointed thereto to define a rigid one piece frame member, the axial width of said polygonal web being less than the axial length of said hub with said spokes being tapered from a

maximum axial width equal to that of the hub at their juncture therewith to a minimum axial width equal to that of said web at the juncture of said spokes within said web; and

retaining means for retaining articles contiguous to the sides of said polygonal member, said retaining means on the lower frame member comprising upwardly opening pockets integrally formed on the outer sides of the polygonal web, and said retaining means on the upper frame member comprising resilient straps secured at one end to one end of each side of said polygonal web and means for releasably attaching the other end of said strap at the other end of said one side of said polygonal web.

3,874,513

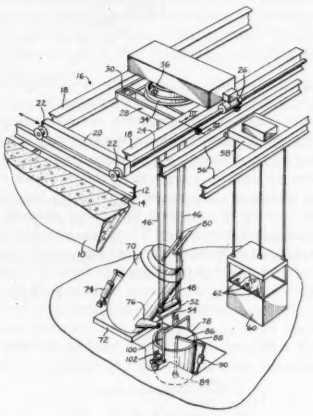
CRANE STRUCTURE

Ray Wilson, R.R. 1 Box 102, West Alexandria, Ohio 45381

Continuation of Ser. No. 202,164, Nov. 26, 1971, abandoned. This application Aug. 20, 1973, Ser. No. 389,594

Int. Cl. B66c *17/10*

U.S. Cl. 212—11 **4 Claims**



1. In combination: a crane; a main crane I-beam structure adapted for being rollingly supported at the opposite ends for movement in a direction transverse to the length thereof, a trolley under which load is always centered, wheels on the trolley engaging the I-beam structure for movement of the trolley on the I-beam structure in the direction of the length of the I-beam structure, a horizontal circular track on said trolley, a rotatable carriage having wheels resting on said track for rotary movement of said carriage on a vertical axis on said carriage, and only one horizontal winch drum on said carriage adapted for sway compensation reeling in and paying out cable connected thereto, said crane I-beam structure comprising spaced parallel I-beams having horizontal lower flanges, the said wheels on said trolley engaging the upper sides of said horizontal lower flanges therebelow, said circular track being on top of said trolley, said trolley being open internally in the region beneath said track to permit concentric carriage positioning and cables leading from said one drum to pass centrally therethrough, cables connected to said one drum at points spaced axially of the drum and leading downwardly therefrom, and a load carrying member connected to said cables at the lower ends thereof and extending horizontally between the lower ends of the cables, said load carrying member connected to ends of cables comprising a hook, a ladle, and a frame tiltably supporting said ladle and engaged by said hook, said ladle having a discharge opening in the bottom, a stopper for the opening inside the ladle, means carried by the ladle for actuating said stopper between open and closed positions, power operable electric motor means on said frame for tilting said ladle therein, drive motors carried by said trolley and carriages for driving at least one wheel on each of said trolley and carriage; a further electric motor carried by said rotatable carriage for driving said one horizontal drum, said means carried by the ladle for actuating said stopper comprising a cylinder fixed to the ladle, a piston in the cylinder and a lever pivoted on said ladle and connected to the piston and also to the stopper, a double acting fluid pump on said frame connected to displace fluid to opposite ends of said cylinder, and an additional electric motor on the frame connected to said pump.

3,874,514

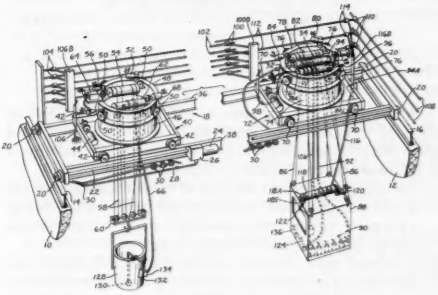
CRANE ARRANGEMENT AND LADLE STRUCTURE

Ray Wilson, R.R. 1 Box 102, West Alexandria, Ohio 45381

Filed Jan. 15, 1973, Ser. No. 323,804

Int. Cl. B16c *17/10*

U.S. Cl. 212—21 **12 Claims**

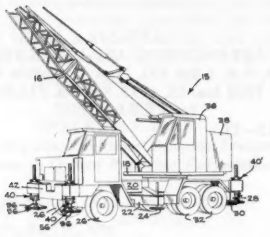


1. In a crane structure a main crane frame comprising parallel rails, a set of support rollers on said main frame for the support thereof on stationary mounted main track members which are parallel to each other and perpendicular to said frame rails, a load trolley having a set of support rollers thereon engaging said frame rails, a first circular track on said load trolley, a load carriage having a set of support rollers thereon engaging said first circular track, drum means rotatable on horizontal axes in said load carriage, load cable means connected to said drum means and leading downwardly therefrom for supporting a load, a cab trolley having a set of support rollers thereon engaging said frame rails a second circular track on said cab trolley, a cab carriage having a set of support rollers thereon engaging said second circular track, a cab beneath said cab carriage, cable means supportingly connecting said cab to said cab carriage, and winch means engaging said cable means and operable for changing the length of said cable means to raise and lower said cab relative to said cab carriage, individual electric motors connected to at least one roller of each set of supporting rollers and means for selectively engaging said motors, a control element in said cab for controlling the energization of each of said motors, a first electric cable leading from said control elements, a rotatably first drum in said cab carriage about which said electric cable is entrained, a second electric cable leading from said first drum to said motors, first slip ring means carried by said first drum and electrically connecting said first cable to said second cable, a third electric cable connected to said control elements, a rotatable second drum about which said third cable is entrained, a fourth electric cable leading from a stationary power supply to said second drum, and second slip ring means carried by said second drum and electrically connecting said third cable to said fourth cable.

3,874,515
COUNTERWEIGHT JACK MECHANISMS FOR CRANES AND THE LIKE

Theodore M. Leigh, Cedar Rapids, Iowa, assignor to FMC Corporation, San Jose, Calif.

Filed May 16, 1973, Ser. No. 360,726
Int. Cl. B66c *23/72, 23/62*
U.S. Cl. 212—49 14 Claims



1. A resilient jack mechanism for use in cooperation with an associated counterweight mounted on a carrier frame of a mobile material handling machine to improve the stability of the machine, the combination which comprises:

a. a housing attached to one end of the carrier frame of the machine adjacent the counterweight, said housing having a top plate with a central opening, having an open bottom and having an external bottom flange;

b. a vertical shaft centrally mounted in said housing, said shaft having an upper end projecting through said central opening in said top plate and having a lower end projecting below said housing, said shaft having a screw thread on its upper end and having a screw thread on at least a portion of its lower end;

c. a ground engaging float connected to the lowermost end of said shaft, said shaft with said float movable between a retracted traveling position and an extended operating position with said float firmly in contact with the ground;

d. a first nut member engaging the screw thread on the upper end of said shaft, said nut member supporting said shaft on said housing top plate and having a lower projection guiding said shaft in said central opening;

e. a spring seat slidingly fitting into the interior of said housing, said spring seat having a hub with a bore larger than said shaft;

f. a retainer plate removably secured to said housing flange, said retainer plate having a central opening into which the lower portion of the hub on said spring seat extends and centrally positions said spring seat;

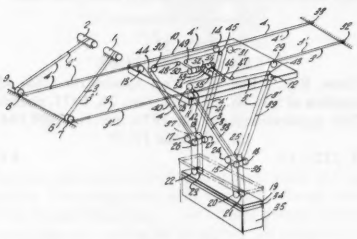
g. a compression spring mounted in said housing around said shaft and between said housing top plate and said spring seat, said spring being initially compressed to a preselected preloading when assembled in said housing and retained by said retainer plate, said preloading providing an upward spring reaction force at least equal to the weight of the counterweight with which the jack mechanism is associated; and

h. a second nut member engaging the screw thread on the lower end of said shaft, said second nut member having an upper projection extending into the bore of said spring seat and guiding said shaft, said shaft being vertically movable by the selective rotation of one of the two nut members and the loosening of the other nut member, both of said nut members locking said shaft after it is located in a selected position.

3,874,516
DEVICE FOR PREVENTING THE SWAYING OF THE SUSPENDING MEANS IN A CRANE

Takayuki Watanabe, Funabashi, Japan, assignor to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo-to, Japan

Filed Sept. 14, 1973, Ser. No. 397,475
Claims priority, application Japan, Dec. 29, 1972, 48-2662
Int. Cl. B66c *21/00*
U.S. Cl. 212—87 10 Claims

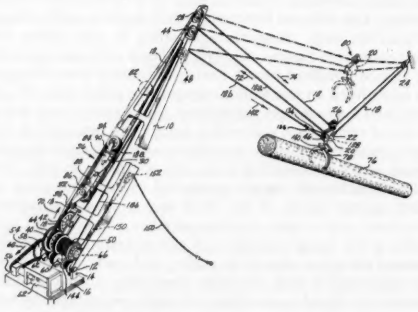


1. A crane comprising a guide track, a carriage movable along said track, load lifting line sheaves spaced apart on said carriage in the direction of movement of said carriage along said track, a load supporting sheave block below said carriage and including means for engaging a load, a guide sheave block disposed between said load supporting sheave block and said carriage and including sheaves disposed closely together relatively to the spacing of said load lifting line sheaves, a load lifting line trained over said load lifting line sheaves and over sheaves of said load supporting sheave block and being guided by sheaves of said guide sheave block to form a V outline of which the apex is at the guide sheave block, winch means and a guide sheave block hoisting line connected to said winch means on said carriage for raising and lowering said guide sheave block independently of said load supporting sheave block whereby the apex angle of said V outline can be varied.

3,874,517
CONTINUOUS LINE YARDER WITH TRACTION AND EXTENSIBLE SHEAVE ASSEMBLIES

James R. Raven, Bellevue, and Frederic E. Langford, Redmond, both of Wash., assignors to Formac International, Inc., Seattle, Wash.

Filed Oct. 26, 1972, Ser. No. 301,128
Int. Cl. B66c *21/00*
U.S. Cl. 212—89 9 Claims



1. A yarding system comprising:

a carriage means having log grasping means thereon,

traction sheave means mounted for rotation on a first support,

an outhaul block means secured to a second support at a location remote from said first support,

flexible rope means having an inhaul portion and an outhaul portion, said outhaul portion being connected to said carriage means and being strung through said outhaul block means and back to said traction sheave means, said carriage means being suspended for movement from said outhaul portion of said rope means at a location between said traction sheave means and said outhaul block means, said traction sheave means engaging said rope means in frictional driving relationship, said inhaul portion extending from said traction sheave means to said carriage means and being connected to said carriage means,

at least one pair of sheave means translatable toward and away from each other, said rope means engaging said pair of sheave means at a location between said carriage means and said traction sheave means, whereupon movement of said pair of sheave means away from each other shortens the effective length of said rope means to raise said carriage means and movement of said pair of sheave means toward each other increases the effective length of said rope means to lower said carriage means, and

prime mover means for reversibly powering said traction sheave means.

3,874,518

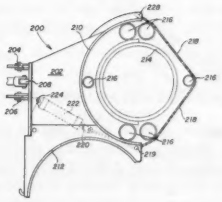
RACKING ARM FOR PIPE SECTIONS, DRILL COLLARS, RISER PIPE, AND THE LIKE USED IN WELL DRILLING OPERATIONS

John J. Swoboda, Jr., and Norman L. Swoboda, both of P.O. Box 1939, Victoria, Tex. 77901

Division of Ser. No. 377,321, July 9, 1973, Pat. No. 3,840,128. This application Jan. 17, 1974, Ser. No. 434,186

Int. Cl. B65g *47/08*

U.S. Cl. 214—1 P **3 Claims**



1. In a racker arm assembly for gripping and guiding riser pipe having an irregular cross-section wherein an extendable boom is movable to and from a plurality of locations in the region of a well drilling platform, the combination comprising:

a gripper head mounted on the end of said boom and having a circular cutout portion for receiving an inner peripheral portion of the riser pipe,

a hydraulic cylinder mounted on said gripper head,

a flexible elongated member attached at one end to said hydraulic cylinder and having a free end, said member being of sufficient length to be wrapped about an outer peripheral portion of the riser pipe,

means for attaching said free end of said flexible member to said gripper head, and

means for activating said hydraulic cylinder to cause the riser pipe to be securely gripped by said gripper head such that the riser pipe may be moved in a vertical position to desired locations in the region of the well drilling platform.

3,874,519

AUTOMATIC MATERIAL FEEDER FOR MULTISPINDLE MATERIAL WORKING MACHINE

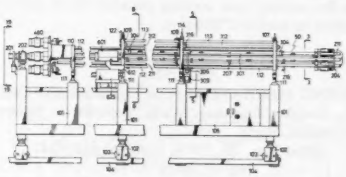
Toshitaka Mikami, 3-6-6, Toyotama Minami, Nerima-ku, Tokyo, Japan

Filed June 18, 1973, Ser. No. 371,160

Claims priority, application Japan, June 20, 1972, 47-61010

Int. Cl. B65h *5/16*

U.S. Cl. 214—1.2 **3 Claims**



1. A feeder for automatically feeding bar material to an automatic working machine with multiple spindles having apparatus at each of a plurality of stations that are arranged on a circumference comprising:

a. a feeder mechanism having a delivery tube assembly at a plurality of stations that are arranged on said circumference and indexed simultaneously with the indexing of said automatic machine;

b. each of said delivery tube assemblies including a means for receiving an integral material, a push rod means adapted to advance and retract said material, means for expelling residual material at a retracted position, and a moving contact for starting a respective delivery motor; and

c. a suitable number of lead plates provided at a predetermined position, whereby when said station is indexed to said position said moving contact provided on said stations will start said driving delivery motor.

3,874,520

APPARATUS FOR FEEDING AN ELONGATE WORKPIECE TO A MACHINE TOOL

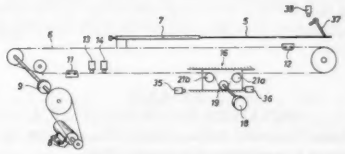
Holger Scheler, Kiel, Germany, assignor to Firma Hermann Traub, Reichenbach (Fils), Germany

Filed Oct. 30, 1973, Ser. No. 411,298

Claims priority, application Germany, Nov. 17, 1972, 2256357

Int. Cl. B23b *13/00*

U.S. Cl. 214—1.5 **6 Claims**



6. An apparatus for controlling a machine tool having an elongate workpiece fed thereto comprising:

a base supporting a workpiece thereon;

conveyor means coupled to said base for moving the workpiece toward a machine tool;

a control member coupled to said base, for movement between a first and second position by said conveyor means;

coupling means supported on said control member for releasably coupling said control member and said conveyor means;

first switch means, coupled to said base, for actuating said coupling means, upon movement of the workpiece by said conveyor means past a predetermined point, to couple said control member to said conveyor means while said control member is in said first position to thereby move said congrol member to said second position;

second swtich means, coupled to said base, for deactuating said coupling means and for actuating the machine tool when said control member has reached said second position; and

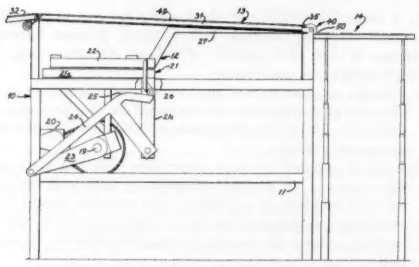
means for moving said control member from said second position to said first position.

3,874,521

STRIPPING MECHANISM FOR LUMBER STACKERS

Sidney L. Lunden, Spokane, Wash., assignor to Moore-Iem, Inc., Spokane, Wash.

Filed Mar. 20, 1974, Ser. No. 452,824
Int. Cl. B65g *57/10*
U.S. Cl. 214—6 DK **4 Claims**



1. In a lumber stacking machine having a supporting framework for receiving layers of boards at a layer loading station with each layer having a forward and rearward board and a lyer handling means movably mounted to the framework for vertical and horizontal movement thereon for (a) lifting successive layers of boards from the loading station, (b) moving the layers forwardly along a forward path, transverse to the lengths of the boards in the layers to a stacking station, (c) lowering the layers to a stack of boards at the stacking station and subsequently, (d) retracting to move the layers in a rearward path against abutment surfaces of a stripping means on the framework, and thereby strip the layers onto the stack as the layer handling means continues to retract, an improvement wherein the abutment surfaces are movable downwardly and are operatively connected to a biasing means for urging downward movement of the abutment surfaces to thereby urge the rearward board engaged therewith downwardly preventing the rearward board from buckling or becoming otherwise disoriented from the layer as the layer handling means is retracted.

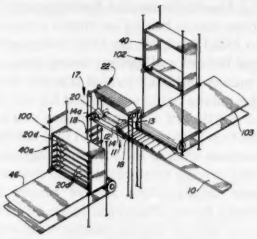
3,874,522

SIGNATURE HANDLING SYSTEM

Victoriano Fernandez Rana, Easton, Pa., assignor to Harris-Intertype Corporation, Cleveland, Ohio

Filed May 16, 1973, Ser. No. 360,897
Int. Cl. B65g *57/00*
U.S. Cl. 214—7 **28 Claims**

16. In a system for handling signatures, means for conveying a stream of signatures to a tray loading location, means for supporting a tray having a longitudinally extending support surface at said tray loading location with said support surface in a horizontal orientation, means for forming a horizontally extending shingled array of signatures on said support surface at said tray loading location, and transfer means for moving a tray with said horizontally extending shingled array of signatures thereon from said means for supporting a tray to a tray receiving location, said transfer means including means for moving a tray along a path at least a portion of which extends



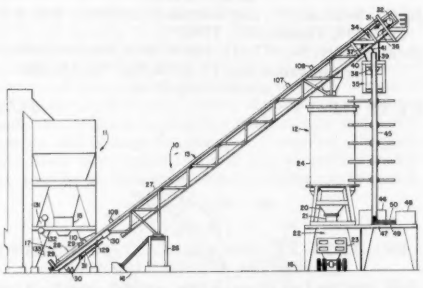
transversely to the longitudinal axis of the said support surface with said support surface in a horizontal orientation.

3,874,523

ASPHALT MIX PREPARATION AND STORAGE PLANT

James Donald Brock; Erbie Gail Mize, both of Chattanooga, Tenn., and Herbert Edward Jakob, Raleigh, N.C., assignors to CMI Corporation, Oklahoma City, Okla.

Filed Dec. 13, 1972, Ser. No. 314,842
Int. Cl. B66b *9/04*
U.S. Cl. 214—17 R **7 Claims**



1. In combination, a bituminous mixing plant or the like including a mix discharge chute spaced above ground level, a first vehicle loading station defined below said mixing plant discharge chute for gravity loading transport vehicles with bituminous mix from said mixing plant discharge chute, a mix storage hopper positioned adjacent said mixing plant and including a mix discharge chute spaced above ground level, a second vehicle loading station defined below said storage hopper discharge chute for gravity loading transport vehicles with bituminous mix from said storage hopper discharge chute, hoist means comprising track means extending at an angle of incline between said mixing plant discharge chute and the upper portion of said mix storage hopper, a carrier movable along said track means, said carrier rated for carrying a maximum weight capacity; a cable connected to said carrier and extending up the track means; a counterweight; pulley means cooperating with said cable for supporting said counterweight with a plurality of lengths of said cable; and drive means connected to said cable for driving said carrier up anc down said track means, the angle of incline of said track means, the weight of said carrier, the approximate maximum weight capacity rating of said carrier, and the effective weight of said counterweight being matched so that the force applied by said drive means to move a fully loaded carrier up the track means is approximately the same as the force applied by said drive means to move the empty carrier down the track means.

3,874,524

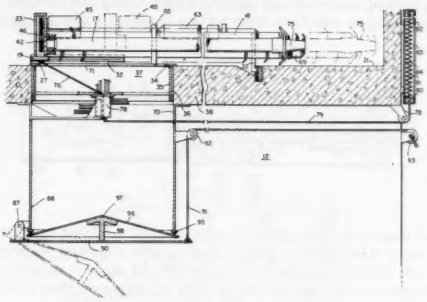
APPARATUS FOR DISCHARGING SILAGE FROM A SILO

Richard L. Weaver, Rt. 1, Myerstown, Pa. 17067

Continuation-in-part of Ser. No. 218,736, Jan. 18, 1972, , and a continuation-in-part of Ser. No. 283,384, Aug. 24, 1972, Pat. No. 3,817,409. This application Apr. 26, 1973, Ser. No. 354,496

Int. Cl. B65g *65/46*

U.S. Cl. 214—17 DA 15 Claims



1. Apparatus for use in unloading a silo from the bottom thereof through a generally central opening therein, comprising an auger for generally radial disposition at the bottom of a silo above the floor thereof, the auger having cutting means thereon for cutting silage and conveying silage radially inwardly toward the opening, means for mounting the auger at the central opening for pivotal movement as the auger sweeps in an arc generally parallel to the floor of the silo about a generally central sweep axis, means for moving the auger in its arcuate sweeping motion, means for drivingly rotating the auger about its own generally radial axis, and selectively operable power means operatively associated with said auger for varying the distance of placement of the auger from a silo wall along a generally radial line from the general center of the silo during the operation of said cutting means and without interrupting the operation of the apparatus, for controlling the proximity of cutting of silage relative to the silo wall.

3,874,525

METHOD AND APPARATUS FOR HANDLING WORKPIECES

Javathu K. Hassan, Hopewell Junction; Alfred Mack, and Michael R. Wojtaszek, both of Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 29, 1973, Ser. No. 375,279

Int. Cl. B65g *65/30*

U.S. Cl. 214—17 B 36 Claims

1. An apparatus for transferring a workpiece into and out of a chamber having a controlled environment through an opening in a wall of the chamber without affecting the environment in the chamber including:

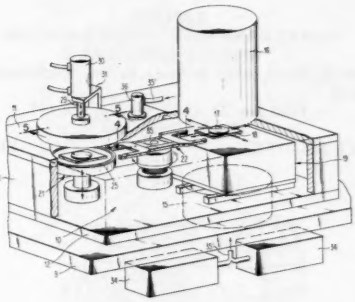
vertically movable means disposed within the chamber;

means to vacuum seal the chamber from the opening in the wall of the chamber when said vertically movable means is in a first position, said vertically movable means being disposed to receive workpieces from and deliver workpieces to exterior of the chamber when in its first position;

movable means to vacuum seal the opening in the wall of the chamber from the atmosphere when said vertically movable means is removed from its first position;

said movable means and said vertically movable means cooperating to form an ante chamber therebetween when said vertically movable means is in its first position and said movable means is vacuum sealing the opening in the wall of the chamber;

means to produce a vacuum in the ante chamber after said vertically movable means receives a workpiece from exterior of the chamber and before said vertically movable means is moved from its first position to a second position in which said vertically movable means is not vacuum sealing the opening in the wall of the chamber, said vacuum producing means providing a vacuum so that the environment in the chamber is not affected by said



vertically movable means moving from its first position to produce communication of said ante chamber with the chamber; and

means to produce substantially atmospheric pressure in said ante chamber after said vertically movable means has moved from its second position to its first position to again form said ante chamber and prior to movement of said movable means to break the vacuum seal between the atmosphere and said ante chamber.

3,874,526

SELF-UNLOADING GROUND VEHICLE

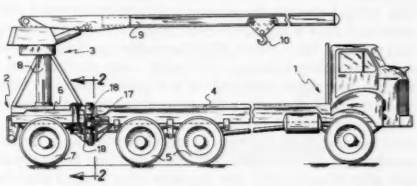
Jules Lambert, 3245 Bourjoly St., Three-Rivers, Quebec, Canada

Filed Aug. 22, 1973, Ser. No. 390,607

Claims priority, application Canada, Aug. 28, 1972, 150410

Int. Cl. B66c *23/36*

U.S. Cl. 214—38 CA 6 Claims



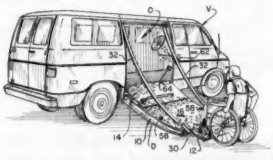
1. A self-unloading vehicle comprising a main power-operated wheeled vehicle unit having a load-carrying platform and an auxiliary wheeled trailer unit, an unloader mounted on said trailer unit including a post secured to and upstanding from said trailer unit and a boom carried by the upper end of said post and adapted to extend over the length of said load-carrying platform, a coupling assembly coupling said trailer unit to the back of said main vehicle unit, so that the latter will tow the trailer unit, said coupling assembly permitting only raising and lowering movement of said trailer unit relative to said main vehicle unit while keeping said trailer unit parallel to itself so as to prevent said boom in said raised or lowered position from protruding laterally of said load-carrying platform during a turn of said main vehicle and to prevent said boom from contacting a load carried by said platform when the vehicle travels on uneven ground and power-operated

means carried by one of said main vehicle unit and said trailer unit and engageable with the other of said main vehicle unit and trailer unit to raise said trailer unit with the wheels thereof off the ground while said main vehicle unit and trailer unit are still coupled together by said coupling assembly and wherein said coupling assembly is detachable and includes upright sliding connectors tractively joining said trailer unit to said main vehicle.

3,874,527
VEHICLE MOUNTED ACCESS RAMP FOR WHEELCHAIR USERS

Robert E. Royce, 4345 S. Santa Fe Dr., Englewood, Colo. 80110

Filed Jan. 24, 1973, Ser. No. 326,451
Int. Cl. B60p *1/44*
U.S. Cl. 214—77 R **13 Claims**



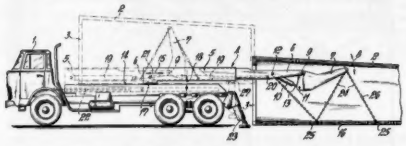
1. In combination with a vehicle having a frame, a floor, and means defining a generally rectangular door opening; an access ramp assembly providing access between the vehicle floor and the ground, said ramp assembly comprising a door adapted to close said door opening, pivot means mounting the lower edge of said door upon said frame for pivotal movement about a horizontal axis extending parallel to the respective lower edges of said door and said door opening, reversible power lift means mounted on said frame and coupled to said door for raising and lowering said door about said axis between a closed position closing said door opening and a lowered position wherein said door projects outwardly from the lower edge of said opening with the outer end portion of the projected door supported upon the ground, means on the inner surface of said door defining a main ramp surface, first ramp means mounted on said door and operable to define a first ramp between the ground and said main ramp surface when said door is in said lowered position, second ramp means mounted on the vehicle floor operable to define a second ramp extending between said main ramp surface and said vehicle floor when said door is in a fully or partially lowered position, said second ramp means comprising a generally rectangular second ramp plate, hinge means mounting said plate on said floor for hinging movement about a hinge axis parallel to said horizontal axis and extending generally along one edge of said plate, the opposite edge of said plate being slidably engaged with said main ramp surface during raising and lowering movement of said door, and anti-rattle means for maintaining said plate out of engagement with said ramp surface when said door is in its closed position.

3,874,528
VEHICLE MOUNTED LOADER FOR HANDLING CONCRETE CASTINGS

Karl Bottenschein, Ulm, Germany, assignor to Lorenz Kesting, Dortmund, Germany

Filed June 18, 1973, Ser. No. 371,156
Claims priority, application Germany, Aug. 25, 1972, 2241784
Int. Cl. B60p *1/48*
U.S. Cl. 214—77 R **2 Claims**

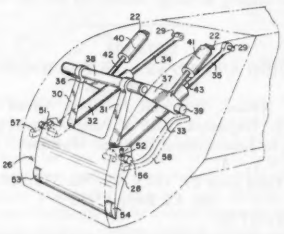
1. Vehicle mounted loader for handling concrete casting or the like provided with at least one opening and a hollow interior comprising a first support member adapted to be mounted on a vehicle for longitudinal shifting movement for extending inside the casting, a lifting device pivoted at one end to a free end of said first support member for rocking movements in a vertical plane and adapted to project into a casting through said opening to lift and lower the casting in the same horizontal position, means for connecting the other end of said lifting device to the lower portion of the casting, power means between said lifting device and said support member for effecting rocking movement of said device for lifting and lowering the casting to and from transporting position, a second support mounted on the vehicle inside of which said first support member telescopes, a vehicle loading area engaging portion on the forward end portion of said second support member, the remainder of said second support member extending rearwardly of said vehicle engaging portion and being spaced vertically from the vehicle loading area a space approximating the thickness of the casting so that the same can be positioned between the said second support member and the loading area, power means for longitudinally shifting said first support member relative to said second support member, and power means for longitudinally shifting both support members.



3,874,529
REFUSE LOADING APPARATUS

Cyril R. Gollnick, Oshkosh, Wis., assignor to Leach Company, Oshkosh, Wis.

Filed May 31, 1974, Ser. No. 475,134
Int. Cl. B65f *3/00*
U.S. Cl. 214—83.3 **10 Claims**



1. In a refuse collection and transport vehicle of the type having a refuse storage body and a hopper for receiving refuse to be loaded therein, loading apparatus for transporting batches of refuse from said hopper to said storage body, said loading apparatus comprising, in combination:

means comprising a packer plate for removing refuse from said hopper;

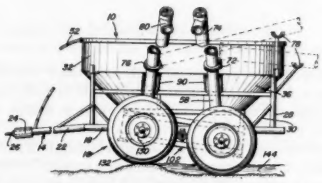
actuating means for urging said packer plate along a defined operating path wherein said packer plate passes through said hopper so as to scoop batches of refuse contained therein into said refuse storage body;

means for sensing separation of said packer plate from the bottom of said hopper and producing a control effect indicative thereof; and

means responsive to said control effect for urging said packer plate downwardly against the bottom of said hopper to reduce the separation of said packer plate there-

from for improved efficiency in transferring refuse into said storage body.

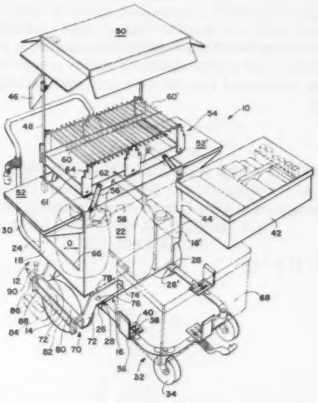
3,874,530
GRAIN CART
George W. Purdy, 601 S. Jefferson, Dewitt, Ark. 72043
Filed Oct. 5, 1973, Ser. No. 403,882
Int. Cl. B60p *1/40*
U.S. Cl. 214—83.32 **6 Claims**



1. A grain cart comprising a body defined by a peripheral wall having an upwardly opening upper end, a frame supporting said body, conveyor means associated with the lower end of the body for unloading grain therefrom, and an independent tandem wheel assembly associated with each side of the frame for supporting the frame and body for movement over irregular surfaces to enable the cart to traverse levees or other irregularities in an angular direction without excessive tilting of the body and spilling of grain therefrom, each tandem wheel assembly including a pair of wheels with pneumatic tires thereon, as elongated beam structure, spindle means supporting the wheels adjacent opposite ends of the beam structure, means centrally of the beam structure rockably supporting the beam structure from the cart frame, limit stop means on the end of the beam structure for engagement with the cart frame for limiting the rocking movement thereof, and guide means on the cart frame associated with the beam structure for preventing excessive lateral deflection of the end portion of the beam structure.

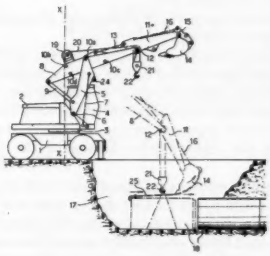
3,874,531
CART AND VEHICULAR CARRYING SYSTEM FOR THE CART
William D. Mayo, Green Glade Rd., Phoenix, Md. 21131
Filed Mar. 21, 1974, Ser. No. 453,415
Int. Cl. B65f *3/02*
U.S. Cl. 214—130 R **53 Claims**

1. A mobile caddy system having means for attachment for transport by a ground supported vehicle comprising, a mobile caddy having: a midbody, including a container, a pair of double-ended securances respectively affixed along respective lower sides of the container in parallel-spaced fore and aft alignment therewith, means for mobile support located proximate the midbody, a handle having engagement at the rear end of said double-ended securances, a forebody having engagement at the front end of said double securances with at least one forebody support affixed to the forebody; said vehicular attachment means including: means positioned laterally of the mobile caddy, means having a portion complementary in shape to the laterally positioned means for securing to a carrying vehicle, and said means for securing having ground



contacting means thereon for lifting the mobile caddy into transport position.

3,874,532
EXCAVATORS FOR DIGGING TRENCHES AND THE LIKE
Roger Metailler, Grenoble, France, assignor to Societe dite: RICHIER, Paris, France
Filed June 14, 1972, Ser. No. 262,540
Claims priority, application France, June 16, 1971, 71.22767
Int. Cl. E02f *3/28*
U.S. Cl. 214—138 **2 Claims**



1. In an excavator,
a jib member,
a pivotal platform,
first pivot means for articulating said jib to said platform,
an arm member,
second pivot means for articulating the arm member to the jib member at one end thereof,
a bucket,
third pivot means for articulating the bucket to the arm member at one end thereof,
a winch mounted permanently on the jib member,
a tackle-block,
hoisting cable means,
at least one pulley, the winch being connected to the tackle-block by the hoisting cable means which passes over the pulley,

means for mounting the pulley exterior to one of said members positioned to permit unobstructed movement of said tackle-block,

means for retaining the tackle-block in a stored condition, and

wherein said arm member has at least one auxiliary axis transverse therewith intermediate the ends thereof and wherein said pulley mounting means comprise an extension positioned coaxial with said at least one auxiliary axis.

3,874,533

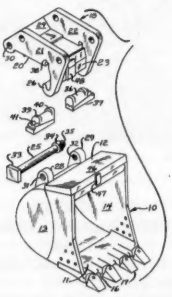
EXCAVATOR BASKET-STICK CONNECTION

Robert A. Montgomery, and Donald J. Greer, Danville, both of Ill., assignors to Esco Corporation, Portland, Oreg.

Filed Jan. 7, 1974, Ser. No. 431,082

Int. Cl. E02f *3/60*

U.S. Cl. 214—145 **7 Claims**



1. A connecting device for interchangeably connecting an excavator basket to an excavator stick comprising

a generally U-shaped frame having a pair of spaced apart, parallel elongated members integrated by a bight member adjacent one frame end,

a cross member further integrating said elongated members spaced from said one end,

said elongated members extending beyond said bight member at said one end and formed into curved lugs adapted to hookingly engage an edge of said basket,

said elongated members adjacent the other frame end being equipped with aligned openings for the receipt of a pivot pin, said pin also adapted to engage the basket pivot means,

each elongated member adjacent said bight member being equipped with a first locking means disposed in confronting relation with its associated lug for receipt of lock to stabilize said frame on a basket against movement on said basket parallel to the length of said elongated members and away from said basket, and

said bight member being equipped with second locking means for engagement with said basket to stabilize said frame against movement on said basket perpendicular to the length of said elongated members.

3,874,534

FAIL-SAFE LOCKING ARRANGEMENT FOR REFUSE COLLECTION

John R. Brisson, Kingsford, Mich., assignor to Lodal Inc., Kingsford, Mich.

Filed Sept. 13, 1973, Ser. No. 396,846

Int. Cl. B65f *3/02*

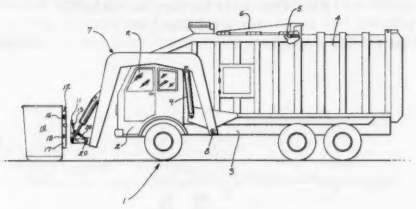
U.S. Cl. 214—302 **8 Claims**

1. In a refuse collection vehicle for use with a refuse container having a female interengaging member, the combination comprising:

a. a body on said vehicle and having an opening for receiving refuse,

b. a boom assembly pivotally mounted on said vehicle for carrying a said refuse container between a lowered position and a raised dumping position,

c. a male interengaging member mounted on said boom assembly and adapted to supportingly engage the said female member,



d. locking means associated with said male member for selective locking engagement with said female member,

e. means normally biasing said locking means toward locking position,

f. and means responsive to the angular position of said boom assembly for overcoming said biasing means for disengaging said locking means from said female member.

3,874,535

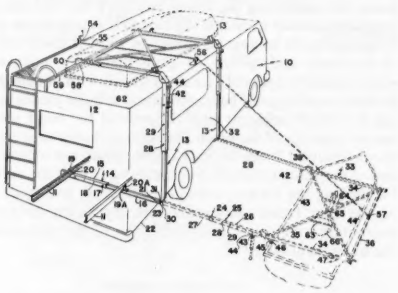
MECHANICAL BOAT LOADING DEVICE

James Donald Killer, 4480 Wilson Rd., Yarrow, British Columbia, Canada

Filed Dec. 26, 1973, Ser. No. 428,429

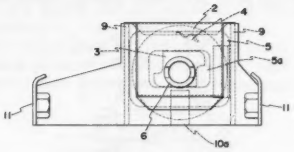
Int. Cl. B60m *9/00*

U.S. Cl. 214—450 **8 Claims**



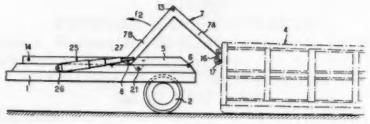
1. A boat loading and unloading device for vehicles such as mobile homes, trailers, vans, campers and the like which include longitudinally extending support means such as a chassis frame and a substantially planar upper roof surface; comprising in combination means to attach the device to the vehicle frame, a main frame hingedly secured by one end thereof to one end of said means and adapted to hinge from a horizontal boat loading position to a vertical position whereby said main frame lies parallel to and contiguous with one side wall of said vehicle, a boat clamping frame hingedly secured to the other end of said main frame, means co-acting between said boat clamping frame and said main frame to limit the hinging relationship therebetween, and means on said clamp frame to detachably secure the associated boat thereto, said means co-acting between said boat clamping frame and said main frame including at least one stop means adjacent the hinge connection of said boat clamping frame to said main frame thereby limiting the angular relationship between said frames from between substantially 180° to substantially 90°.

3,874,536
SPARE TIRE HOLDER FOR AN AUTOMOBILE
Yoshio Watanabe, 4-3 Yokowari, 2-chome, Fuji, Japan
Filed July 25, 1973, Ser. No. 382,322
Int. Cl. B62d 43/00
U.S. Cl. 214—451 1 Claim



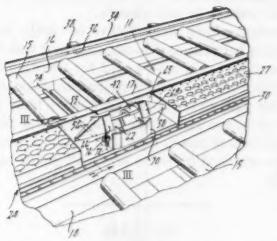
1. A spare tire holder device comprising:
a. a bracket means for the detachable mounting of a spare tire wheel;
b. a winch mounted on a vehicle chassis;
c. a chain or the like connected to said winch and said bracket means to pull on and hold said bracket means with said spare tire wheel thereon; wherein said winch comprises:
d. a gearing transmission comprising:
e. a winding wheel about which said chain or the like is wound thus pulling said bracket means; said winding wheel being integral with a link gear engaged with a planet gear, said being integral with a drive shaft which slides over a limited range in an elongate rectangular aperture to accommodate pulsation caused by the winding or unwinding of said chain or like because of the uneven contact surface of the chain or the like and the winding surface.

3,874,537
ROAD VEHICLE OF THE PLATFORM TYPE
Jean Kou, 15, Rue Sassier Leroy, Paris, France
Filed Oct. 23, 1973, Ser. No. 408,932
Int. Cl. B60p 1/14
U.S. Cl. 214—501 7 Claims



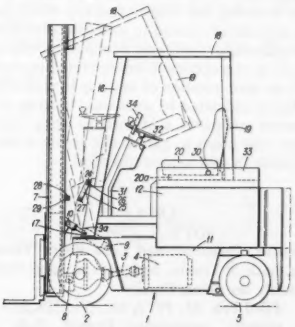
1. In a road vehicle adapted to removably carry a load and having a main chassis, an improvement comprising a controlling mechanism including an auxiliary load-carrying chassis extending over the main chassis and pivotally connected to the main chassis around an axis extending transversely across the rear end of said main chassis, a lever adapted to engage at one end the front end of the load to be carried by the main chassis and pivotally secured through its other end to the auxiliary chassis, single control means controlling selectively the pivotal movement of the auxiliary chassis around its axis and the pivotal movement of the lever and therethrough the shifting of the load between the ground and the upper surface of the auxiliary chassis and means for locking selectively the lever on the auxiliary chassis and the auxiliary chassis on the main chassis.

3,874,538
RESTRAINT FOR CONVEYORIZED TRAILERS AND THE LIKE
Eugene S. Kessler, Westland, and John E. Getz, Grosse Pointe Farms, both of Mich., assignors to Fruehauf Corporation, Detroit, Mich.
Filed Mar. 29, 1974, Ser. No. 456,307
Int. Cl. B60p 1/64
U.S. Cl. 214—516 13 Claims



1. In a conveyorized vehicle having a conveyor system thereon along which cargo members of different widths are movable, cargo restraining means carried by the vehicle in areas between spaced elements of the conveyor system and spaced from both sides of such system, said restraining means including a restraining element movable between a raised holding position in which it projects above the top plane of the conveyor system and a depressed position below such plane, means biasing said element to the raised position, and an actuating shoe for the restraining element engageable by a cargo member which extends laterally thereover in bridging relation thereto while resting on the conveyor, to move the restraining means down to the retracted position, and whereby at other times said element is raised and is thereby effective to extend upwardly beside and restrain a cargo member which lies to one side of such bridging position.

3,874,539
FORK LIFT TRUCKS
David Robert Staley, Bedfordshire, England, assignor to Lancer Boss Limited, Leighton Buzzard, England
Filed Apr. 9, 1973, Ser. No. 349,046
Claims priority, application United Kingdom, Apr. 17, 1972, 17628/72
Int. Cl. B66f 9/20
U.S. Cl. 214—674 6 Claims



5. A battery operated fork lift truck comprising a chassis, a mast assembly supported at one end of said chassis and including fork carriage means mounted for movement on said mast assembly,

battery mounting means near the other end of said chassis for mounting a battery thereon,

power operated means connected to said mast assembly to cause movements of said mast assembly,

a rigid load guard having front and rear uprights interconnected lengthwise and transversely at their upper ends by a protective frame and rigidly connected at their lower ends,

said load guard being in the form of a unitary assembly with a truck steering wheel and tiltable at its mast assembly end with respect to said chassis,

and a linking means detachably, pivotally mounted for connection between said load guard and said mast assembly, to connect said load guard for pivoting of said load guard about its mast assembly end to dispose said guard out of the path of removal of a battery from said battery mounting means and return it to its initial position upon actuation of said power operated means when said linking means is attached between said load guard and said mast assembly.

3,874,540

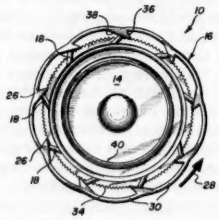
TAMPERPROOF CAP

Walter E. Hidding, Rt. No. 2, Woodrock Rd., Barrington Hills, Ill. 60010

Filed Jan. 30, 1974, Ser. No. 437,778

Int. Cl. B65d *41/34, 41/36, 41/38*

U.S. Cl. 215—252 **4 Claims**



1. A tamperproof cap for use with a container having a threaded neck portion and at least one external tooth, said cap comprising: an internally threaded cap body; a tamperproof ring having a plurality of circumferentially spaced, radially inwardly extending, triangularly shaped pawls for locking engagement with said container tooth in a first direction of rotation and riding over said container tooth in a second, opposite direction of rotation; and a plurality of breakable connectors coupling said ring to said cap body, said connectors being individually joined to said pawls for holding a said pawl in engagement with said container tooth whereby to insure breaking of said connectors and releasing said ring from said cap body upon rotation of said cap in said first direction, said ring being undulated by outwardly bending portions disposed between said pawls, said portions being relatively more flexible than said pawls to permit said pawls to ride over said container tooth in said second direction.

3,874,541

BOTTLE STOPPER

Jean Lagneaux, Peronnas, and Leon Roger Vermeerbergen, Lagnieu, both of France, assignors to Saint-Gobain Industries, Neuilly sur Seine, France

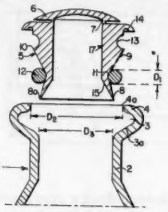
Filed Feb. 23, 1972, Ser. No. 228,558

Claims priority, application France, Feb. 24, 1971, 71.06229

Int. Cl. B64d *39/04;* **B65d** *41/32*

U.S. Cl. 215—253 **10 Claims**

1. The combination, with a bottle neck flared outwardly and upwardly at its upper end to define an internal inverted frusto-conical surface surmounted by an inwardly curled rim, of a hollow stopper formed to fit said neck and to define an external second inverted frusto-conical surface of lesser generating angle than said first surface and surmounted at its top by an annular outwardly facing channel, a sealing ring movable along said second surface from a first position about the smaller diameter thereof, to a second position in said channel, said surfaces cooperating in response to insertion of said stopper into said neck, into a final sealing position therein, to



cam said ring from first to second position wherein the same makes sealing contact with said rim, said channel and rim being so dimensioned that the radially innermost point of contact of said rim with said sealing ring and the outermost point of contact of said sealing ring with the lower part of said channel are spaced from each other by more than 180° of angular measure of the cross-section of said sealing ring measured from the center of said cross-section radially inwardly toward the axis of the bottle neck.

3,874,542

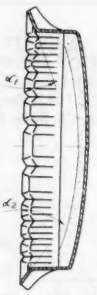
CROWNED COVER

Zygmunt Kowalczyk, Opolska 59/201, Goleniow, Poland

Filed Nov. 28, 1973, Ser. No. 419,722

Int. Cl. B65c *41/12*

U.S. Cl. 215—328 **4 Claims**



1. Crown cover for hermetically closing bottles on a one-time basis, comprising a seal, a crowned flange with individual segments inclined at different angles measured along the radius of the circle described on said flange.

3,874,543

COLLAPSIBLE CONTAINERS

William J. Farnsworth, McComb, Miss., assignor to Altamil Corporation, Indianapolis, Ind.

Continuation-in-part of Ser. No. 115,302, Feb. 16, 1970, Pat. No. 3,729,111. This application Feb. 7, 1973, Ser. No. 330,273The portion of the term of this patent subsequent to Apr. 24, 1990, has been disclaimed.

Int. Cl. B65d *9/14*

U.S. Cl. 217—48 **14 Claims**

1. A collapsible container comprising:

a pair of rectangular side panels and a pair of rectangular end panels, each side panel having opposite edges located

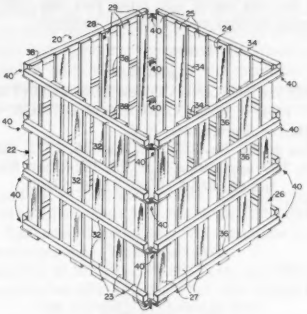
adjacent to the edges of said end panels to provide the corners of the collapsible container;

a plurality of horizontal side panel cleats mounted on the exterior of each side panel;

a plurality of horizontal end panel cleats mounted on the exterior of each end panel, said end panel cleats being aligned with said side panel cleats; and

a plurality of swivel hinge corner assemblies located at each corner of the collapsible container for connecting adjacent side panels and end panels, each corner assembly comprising

a first corner plate secured to a side panel cleat with a prong projecting laterally from one edge of said first corner plate toward the adjacent end panel,



a second corner plate secured to an end panel cleat with a prong projecting laterally from one edge of said second corner plate toward the adjacent side panel and overlapping the prong of said first corner plate, and

pivot means spaced laterally from the edges of said corner plates for pivotally connecting said prongs of said corner plates to permit said side panels and end panels of the container to collapse;

each of said side panels having its edges spaced laterally backward from the ends of said side panel cleats and each of said end panels having its edges spaced laterally backward from the ends of said end panel cleats to permit the prongs projecting from the first and second corner plates to overlap at the corners of the container.

3,874,544

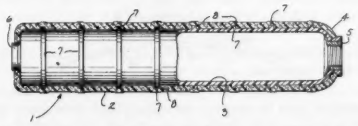
PRESSURE VESSEL WITH LINER

Emerson R. Harmon, Hartland, Wis., assignor to The Amolga Corporation, Menomonee Falls, Wis.

Filed Mar. 21, 1973, Ser. No. 343,200

Int. Cl. B65d *25/14*

U.S. Cl. 220—3 **7 Claims**



1. A lined pressure vessel comprising an outer shell of thermosetting resin impregnated filaments, a corrosion resistant one piece plastic liner overlying the entire inner surface of the shell and having a coefficient of thermal expansion and contraction substantially greater than the shell, and a plurality of longitudinally spaced annularly extending abutments integrally provided on the outer surface of the body of the liner and embedded in intimate engagement with the resin impregnated filaments of the shell to mechanically lock the liner to the shell and restrain movement of the liner relative to the shell when the vessel is in service.

3,874,545

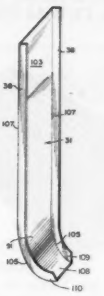
CRYOGENIC TANK AND TANK LINER WITH CURVED FLANGES

Leigh A. Struss, Nashua, N.H., assignor to Martin Welding Inc., Lowell, Mass.

Division of Ser. No. 226,640, Feb. 25, 1972, Pat. No. 3,765,211. This application Apr. 12, 1973, Ser. No. 350,349

Int. Cl. B65d *7/02*

U.S. Cl. 220—5 A **5 Claims**



1. An elongated, relatively thin metal sheet adapted to form a liner section of an expansible wall and floor of a cryogenic tank, said sheet comprising:

an elongated body having an upper wall portion and an integral lower floor portion with an upstanding flange along each opposite longitudinal edge thereof, said flange being bent along a compound curved base line progressively and evenly with a roll bent appearance free of unwanted crimps and wrinkles,

said lower floor portion being bent inwardly out of the plane of said upper wall portion in a transition curve to a terminal lower edge portion substantially in a horizontal plane for merging with the floor of said tank,

said body being at least 30 feet long, 2 feet wide and of stainless steel and each said flange extending continuously the full length of both said longitudinal side edges, of said upper wall portion and said lower floor portion to a height of at least 2 inches, while being free of crimps, fractures or pleats.

3,874,546

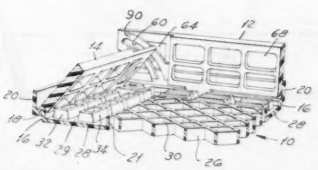
CONVERTIBLE CONTAINER-PALLET

Ellsworth E. Sanders, Sanibel Island, Fla., and Elsmer W. Kreeger, Pontiac, Mich., assignors to Pinckney Molded Plastic, Inc., Pickney, Mich.

Filed Oct. 11, 1973, Ser. No. 405,299

Int. Cl. B65d *7/24*

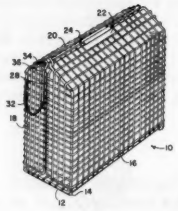
U.S. Cl. 220—6 **16 Claims**



1. A container capable of being converted to a pallet, comprising a horizontal bottom wall, upright side walls pivoted to opposite sides of said bottom wall, upright end walls pivoted to opposite ends of said bottom wall, means releasably holding said side and end walls upright, the top surface of said bottom

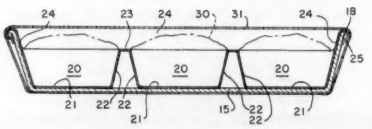
wall having relieved areas adjacent the sides and ends thereof, said container being converted to a pallet by swinging said side and end walls inwardly to positions in which they are received by said relieved areas.

3,874,547
CADDY FOR COMPACTED-REFUSE
Donald W. Howard, Box 101, Dover Rd., Reisterstown, Md. 21136
Filed Mar. 28, 1973, Ser. No. 345,772
Int. Cl. B65d *7/20*
U.S. Cl. 220—19 **2 Claims**



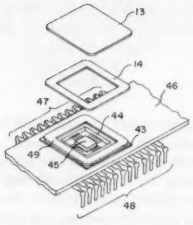
1. A compacted-refuse caddy comprising: a flat bottom having parallel edges, a pair of sides, a hinge member securing the sides respectively to the parallel edges of the bottom, each side having at each end a fixed inward turned end portion which abuts the bottom and the inward turned end portion of the other side when the caddy is closed, each side having a fixed top portion inclined upwardly toward the center, each fixed top portion parallel with and abutting the other top portion when the caddy is closed; the top portions respectively having rods along the abutting portions with hand-recesses adjacent the respective rods, the hand recesses proximately located for adapting the rods to serve as handle structure, each rod having a resilient tubular grip thereon, all said bottom and and sides being of openwork construction, and means for securing said sides together when the caddy is closed, including a securance comprising an elongate rigid rod having first and second ends with an open loop in the first end thereof, the loop comprising substantially one and one-half turns; the spacing between the turns and the diameter of the loop dimensioned for receiving therebetween said rods when abutting and for capturing the rods within the loop when the securance is operatively rotated.

3,874,548
BAKING UTENSIL
George J. Buff, Jr., Kresson Rd., Cherry Hill, N.J. 08034
Filed Sept. 27, 1972, Ser. No. 292,730
Int. Cl. B65d *57/00, 85/00*
U.S. Cl. 220—21 **6 Claims**



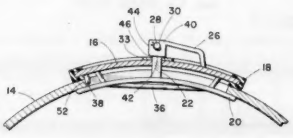
1. A baking utensil comprising a hollow upwardly opening outer part fabricated of a single sheet of metal including a generally flat bottom wall and upstanding peripheral side wall, and an inner part fabricated of a single sheet of metal and disposed in said outer part, the metal sheet of said outer part being of heavier gauge that the metal sheet of said inner part, said inner part comprising a plurality of hollow upwardly opening receptacles disposed in side-by-side relation with each other and each having a generally flat receptacle bottom resting on the outer part bottom wall, a web extending between the upper regions of adjacent receptacles, web extensions extending to the peripheral side wall of said outer part, and securing means securing said web extensions to said outer part peripheral side wall, said inner and outer parts effectively reinforcing and rigidifying each other by the multiple flat surface area engagement therebetween and the peripheral securement together of the inner and outer parts, said receptacles terminating at their upper edges below the upper edges of said outer part side wall, said web lying in a plane spaced below the plane of said outer part side wall upper edges, and said web extensions lying against said outer part peripheral side wall, whereby contents of said receptacles cresting above the latter but not above said outer part side wall facilitate overwrapping without contacting the contents.

3,874,549
HERMETIC SEALING COVER FOR A CONTAINER FOR A SEMICONDUCTOR DEVICE
Norman Hascoe, Portchester, N.Y.
Division of Ser. No. 257,390, May 26, 1972, Pat. No. 3,823,468. This application Mar. 25, 1974, Ser. No. 454,773
Int. Cl. B65d *39/00, 41/00, 53/00*
U.S. Cl. 220—200 **2 Claims**



1. An hermetic sealing cover for a container for a semiconductor device comprising:
a conductive cover element;
and a preformed ring of heat-fusible conductive material disposed in registry with the periphery of said cover element and fused thereto at a plurality of spaced points.

3,874,550
ACCESS DOOR FOR CYLINDER
Jerry D. Gordon, 10765 E. 11th St., Tulsa, Okla.
Filed June 21, 1973, Ser. No. 372,395
Int. Cl. B65d *45/00*
U.S. Cl. 220—213 **2 Claims**



1. An access door for a rectangular opening in the cylindrical wall of a cylindrical member comprising a substantially rectangular and curved plate having substantially the same curvature as that of the cylindrical wall and having a size somewhat larger than the opening in the rectangular wall, said curved rectangular plate being further defined by a pair of spaced and straight end edges parallel to the axis of the cylindrical member and a pair of curved side edges spaced from each other and lying in planes normal to the central axis of the cylindrical member, a curved and resilient locking band radially slidably mounted against the concave face of said curved

rectangular plate and being disposed generally parallel to the curved side edges of said locking plate, said curved locking band having a length substantially equal to the distance between the end edges of said plate, a substantially radial rod connected to the center of said locking band and passing through a hole adjacent the center of said plate, a handle mounted on the outer end of said rod adjacent the convex surface of said plate, said handle being mounted on said rod by means of a set pin passing through suitable holes in said handle and said rod, said handle having a cam member adapted to bear against the convex surface of said plate, said holes being mounted eccentrically in said cam member, a gasket surrounding the edges of said curved rectangular plate and adapted to be positioned between said plate and said cylinder when said plate is in position, a pair of stiffening braces secured to the concave surface of said plate and being spaced from each other, said stiffening braces being substantially chordal with respect to the central axis of said cylindrical member and a pair of positioning lugs projecting radially inward towards the central axis of said cylindrical member and being located adjacent one edge of said curved rectangular plate.

3,874,551

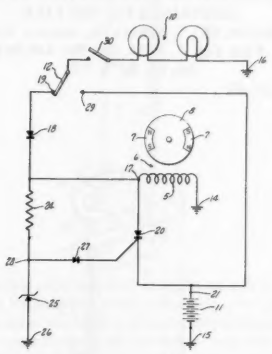
ALTERNATOR ELECTRICAL SYSTEM FOR BATTERY CHARGING AND LOAD ENERGIZATION

Joseph R. Harkness, Germantown, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.

Continuation of Ser. No. 229,891, Feb. 28, 1972. This application Oct. 15, 1973, Ser. No. 406,681

Int. Cl. H02j *7/13;* **H02p** *9/00*

U.S. Cl. 320—39 **6 Claims**



1. Means for energizing an electrical load and for simultaneously charging a battery that can serve as an alternate source of energization for the load, said means comprising:

A. a winding in which an alternating current can be induced;

B. means for inducing an alternating current in the winding;

C. first half-wave rectifier means connectable in series circuit with the entire winding and the load for energizing the load with half-cycles of current of one polarity that are induced in the whole winding, and arranged to prevent current of the opposite polarity from flowing to the load;

D. second half-wave rectifier means so connected in series with the battery and the entire winding as to provide for charging the battery with current of said opposite polarity that is induced in the whole winding and to prevent current of said one polarity from flowing to the battery; and

E. voltage regulator means operatively connected in a circuit with said second rectifier means and the battery for controlling current flow to the battery in accordance with the voltage across the battery terminals.

3,874,552

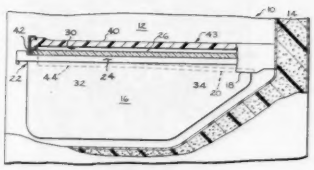
REFRIGERATOR APPARATUS

Bernard J. Grimm, Louisville, Ky., assignor to General Electric Company, New York, N.Y.

Filed Dec. 17, 1973, Ser. No. 425,243

Int. Cl. B65d *43/12*

U.S. Cl. 220—23.83 **5 Claims**



1. A refrigeration apparatus, comprising:

a cooling chamber having walls;

a receptacle having an upper end and a flange extending outwardly from said upper end;

slideways connected to the cooling chamber walls and extending along opposed sides of said cooling chamber, said slideways each having forward and rearward portions with said rearward portion extending downwardly and rearwardly from said forward portion;

a receptacle cover having forward and rearward portions and being movably positioned within the slideways, said cover being movable in response to movement of the receptacle in the slideways between a first position at which the rearward portion of the cover is supported by the rearward portion of the slideways and the forward portion of the cover is spaced from forward portions of said slideway and a second position in which the cover is supported by the receptacle flange and is spaced from the slideways by the intervening flange.

3,874,553

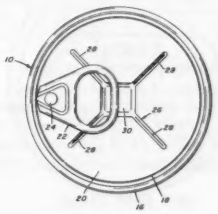
EASY OPENING CAN END WITH EMBOSSED PANEL

Fred R. Schultz, Lower Burrell, and James R. Morran, New Kensington, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed July 19, 1973, Ser. No. 380,990

Int. Cl. B65d *17/20*

U.S. Cl. 220—273 **8 Claims**



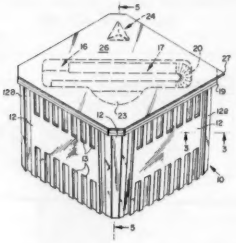
1. In an easy opening can end having a circular score line therein defining a removable panel and a substantially rigid pull tab attached to the removable panel adjacent the score line, the improvement comprising an X-shaped embossment substantially centered in the removable panel and the centerline of the tab substantially bisecting the included angle between two legs of the embossment.

3,874,554

COMBINATION LIQUID CONTAINER AND DRINKING STRAW

Henry M. Chang, New York, N.Y., assignor to First Dynamics, Inc., New York, N.Y.

Filed June 25, 1973, Ser. No. 373,250
Int. Cl. A47g *19/22*
U.S. Cl. 220—90.2 **8 Claims**



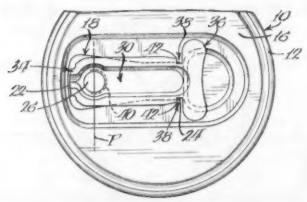
1. In combination, a liquid container body substantially square in outline including a bottom wall and four upstanding surrounding walls, said surrounding walls having a circumferential flange extending outward from the top edges thereof, a first lid sealed to said flange and closing said body, said first lid having an elongated diagonal recess therein and a puncturable depression therein spaced from said recess, a drinking straw nesting in said recess, a second lid sealed on said first lid and covering said first lid throughout the area of said first lid and hence sealing said recess and said depression from the outside air, said body and said first lid being formed of relatively stiff plastic sheet material, said second lid being formed of plastic sheet material which is more flexible and thinner than said relatively stiff material, said depression being a pyramidal shape and hence having triangular walls extending downward into said body, said triangular walls being thinner than the remainder of said first lid and hence readily separable upon pressing downward thereinto one end of said straw.

3,874,555

END PANEL FOR CONTAINERS

Leon M. Patarini, Palos Hills; Joseph A. Bronec, Chicago, and Arthur P. Zundel, Mount Prospect, all of Ill., assignors to National Can Corporation, Chicago, Ill.

Filed Mar. 28, 1974, Ser. No. 455,525
Int. Cl. B65d *17/00*
U.S. Cl. 220—269 **13 Claims**



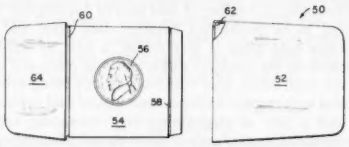
1. An easy open end panel having a weakened area defining a generally U-shaped, elongated tear strip in said end panel, said tear strip having a leading end and an opposite base end, said leading end being located adjacent the periphery of said end panel and said base end defining a permanent connection between said tear strip and said end panel, said weakened area producing a residual between said tear strip and said end panel, said residual having an area of minimum thickness on at least a portion of said leading end and an area of maximum thickness adjacent said base, said residual having an increasing thickness between said residual area of minimum thickness and said residual area of maximum thickness.

3,874,556

PACKAGE WITH COMPLEMENTARY BODY SHEETS

Raymond Finkelston, Jr., 8505 Glen Campbell Rd., Philadelphia, Pa. 19128

Filed Dec. 11, 1972, Ser. No. 314,169
Int. Cl. B65d *41/00*
U.S. Cl. 220—306 **10 Claims**



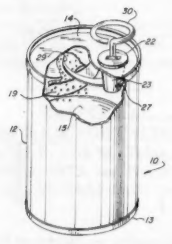
1. A package comprising a body, and a severable cover, a portion of said body being smaller than the cover to permit the telescoping of the cover and body on severance of the cover, said body being formed with an outwardly facing groove, and an inturned lip integrally connecting said body to said cover for severance of the lip from the body with said cover and removable engagement of the lip into and out of said groove upon said telescoping.

3,874,557

SELF-COOLING OR SELF-HEATING BEVERAGE CONTAINER OR THE LIKE

Harold E. Porter, 987 S. Newark St., Aurora, Colo. 80012

Filed Feb. 7, 1974, Ser. No. 440,461
Int. Cl. B67b *7/24*
U.S. Cl. 222—80 **11 Claims**



1. A self-cooling or self-heating comestible container for storing such comestible and chilling or heating the same prior to dispensing, the container comprising

a. an enclosed, rigid, hollow shell means having opposed first and second end walls and an intermediate side wall;

b. a comestible receptacle means arranged within the shell means and communicating with said first end wall whereby comestible can be stored therein, said receptacle means arranged to occupy a predetermined volume of said shell means;

c. comestible cooling or heating means provided within the said shell means and partially surrounding said comestible receptacle, said cooling or heating means comprising:

1. two chemical ingredients which are stored separately and when mixed together, produce a thermal reaction which cools or heats the comestible stored within said comestible receptacle means;

2. one of said ingredients being sealed within a pouch attached adjacent to said second end wall;

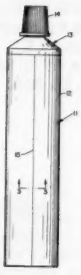
3. the remaining ingredient arranged to surround said pouch and comestible receptacle and fill the remainder of said shell volume; and
4. rupturing means mounted on said second wall whereby action of said rupturing means causes the opening of said pouch to mix the ingredients to cause said thermal reaction and

d. said rupturing means includes a plug rotatably mounted in an opening provided in said second end wall, said plug includes knife means having one end depending therefrom and arranged in position outwardly from the longitudinal axis of said plug, said knife having means provided at its outer end whereby as said plug is rotated, said outer means will move so as to rupture said pouch to permit mixing of the thermal ingredients.

3,874,558
DISPENSING CONTAINER MANUFACTURING APPARATUS AND METHODS

Winston G. Rockefeller, Woodcliffe Lake, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 308,999, Nov. 24, 1972, Pat. No. 3,832,964. This application Apr. 16, 1974, Ser. No. 461,300
Int. Cl. B65d *35/00*
U.S. Cl. 222—92 **3 Claims**

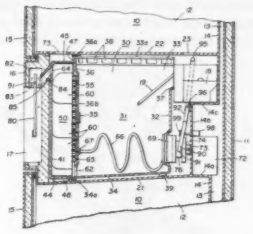


2. A collapsible tube assembly comprising a flexible tubular body having a longitudinal seam containing overlapped layers of sheet material of the body wall and a dispensing head structure secured upon one end of said body, said head structure comprising an inner hollow element having an inclined annular shoulder, a reduced diameter nozzle section projecting longitudinally from the inner periphery of said shoulder, an annular skirt projecting longitudinally from the outer periphery of said shoulder and a shallow external surface recess extending longitudinally along said skirt and along said shoulder, and an outer hollow element disposed in tight substantially nested relation with said inner element, said outer element having an annular shoulder of corresponding inclination with and surrounding the annular shoulder of said inner element, a longitudinally extending nozzle section surrounding the nozzle section of the inner element, and a longitudinally extending skirt surrounding the skirt of the inner element with the outer diameter of the skirt of said outer element being substantially equal to the outer diameter of said body one end, said body one end extending longitudinally between said skirts and then being bent inwardly to pass between said shoulders, and said body seam being substantially confined in said recess, whereby said tube body and head structures are nondeformably internested and so mechanically interlocked as to resist axial separation of the tube body and head structure due to normal axial pull.

3,874,559
ICE DISPENSER FOR FREEZER-REFRIGERATORS AND THE LIKE

John J. Pink, 519 33rd St. N.E., Cedar Rapids, Iowa 52404

Filed Jan. 16, 1974, Ser. No. 433,901
Int. Cl. B67d *5/62*
U.S. Cl. 222—146 C **8 Claims**



1. In an ice dispenser for use with refrigeration apparatus, the dispenser having an ice reservoir effective to receive pieces of ice from an ice maker, the reservoir including an upstanding front wall, a rear wall and a bottom wall interconnecting the front and rear walls, a power drivable ice lift wheel mounted outside of the reservoir front wall for rotation in one direction about an axis extending forwardly from said front wall, a lift wheel housing mounted forward of the reservoir front wall and including a front wall and a peripheral wall enclosing the lift wheel, a plurality of compartments for holding ice pieces disposed peripherally about the lift wheel, the compartments being formed by the reservoir front wall, the housing front and peripheral walls and a plurality of spaced compartment partition walls extending between the lift wheel periphery and the housing peripheral wall and transversely of and between the reservoir and housing front walls, the compartments opening rearwardly toward the reservoir front wall and forwardly toward the housing front wall, means in the reservoir effecting movement of ice pieces therein toward the reservoir front wall, an ice inlet through the reservoir front wall effective so that the ice moving means also impels pieces of ice in the reservoir through the ice inlet into lower ones of the lift wheel compartments during said rotation of the wheel, and an ice outlet through the housing front wall communicating with upper ones of the lift wheel compartments during said rotation of the wheel, the lift wheel compartments being effective to transport ice pieces received therein from the ice inlet up to the ice outlet and to discharge the same therethrough during said rotation of the wheel, the improvement wherein said partition walls comprise blades formed of resiliently flexible sheet material carried by the lift wheel.

3,874,560
PNEUMATIC CONVEYORS

Leslie George Powning, Stockport, England, assignor to Sturtevant Engineering Company Limited

Continuation of Ser. No. 144,859, May 19, 1971, abandoned. This application May 8, 1973, Ser. No. 358,416
Claims priority, application United Kingdom, May 22, 1970, 25011/70
Int. Cl. B67d *5/54*
U.S. Cl. 222—193 **3 Claims**

1. Apparatus for feeding particulate or powder material comprising:

a hopper for the material, said hopper having an outlet,

a valve comprising a body, said body having an annular wall,

a plate engaging one end of said wall and defining an inlet to said body, and a plate engaging the other end of said wall and defining an outlet,

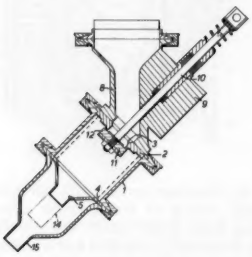
an inlet pipe extending from said inlet of said body and connected to said outlet of said hopper, said inlet pipe

and said inlet of said body having axes that are inclined to one another,

an outlet pipe extending from said outlet exteriorly of said body,

a valve member including a disc movable to open and close said inlet,

means for moving said disc comprising a solenoid and a control rod connected to said disc and to said solenoid and extending from said disc through said inlet and transversely through said inlet pipe towards said solenoid, said solenoid being mounted exteriorly of said body,



a one-way flat valve member at said outlet operable by a differential pressure thereacross between the pressure in said body and the pressure in said outlet pipe; said disc and said flat valve member being disposed coaxially of said body with said control rod extending axially of said inlet towards said solenoid so that the flow path in said body between said disc and flat valve is unobstructed, and,

means for coupling said body downstream of said inlet to a gas supply.

3,874,561

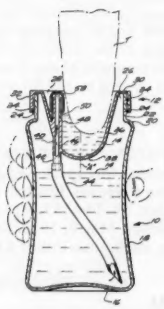
DISPENSER CUP HAVING A WELL THEREIN

Eli A. Zackheim, Norwich, and Jerome Silverstein, Franklin, both of Conn., assignors to Jules Silver, Norwich, Conn.

Filed Mar. 2, 1973, Ser. No. 337,652

Int. Cl. B65d *37/00*

U.S. Cl. 222—207 **5 Claims**



1. A dispensing device adapted for use with a flexible wall container having a wide mouth, defined by an upper edge portion of the container, and a quantity of liquid therein, said device comprising:

a. a cup having an open well formed therein extending into the interior of said container through said wide mouth and an annular top wall surrounding said well and located above the upper edge of the container;

b. said cup including a skirt depending from the annular top wall and adapted to be connected to said container, said skirt surrounding and being spaced from an adjacent portion of said well to receive the container's wide mouth in the space therebetween;

c. said well having a continuous inwardly tapered side wall extending from said annular top wall into the wide mouth of the container about the longitudinal axis of the cup and a concave bottom wall defining the bottom of the well, said tapered side wall and said bottom wall being dimensioned to receive a cow's teat therein;

d. said cup further including a conduit formed integral with said side wall and having an upper end extending into the well and a lower end extending into the container, said conduit having a bore therethrough and being located in said well eccentrically of and generally parallel to the longitudinal axis of the cup thereby providing an enlarged open area of the well adapted to receive the cow's teat;

e. a cap surrounding the upper end of the conduit extending into the well; and

f. at least one recess portion formed between said cap and the exterior surrounded end of the conduit, whereby a path is formed for the liquid in the container forced therefrom by squeeze pressure, said path being through the conduit bore into the formed recess and then downwardly into the dispenser well.

3,874,562

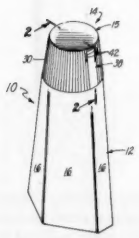
DISPENSING CLOSURE WITH PUMP PARTS AND CONTAINER USING THE SAME

Robert E. Hazard, North Kingstown, R.I., assignor to Polytop Corporation, Slatersville, R.I.

Filed Nov. 10, 1972, Ser. No. 305,559

Int. Cl. B65d *37/00*

U.S. Cl. 222—209 **10 Claims**



1. In the combination of a deformable container and a dispensing closure used in removing contents from within said container, said closure having a cap with an opening extending therethrough and a spout movably mounted on said cap so as to be capable of being moved between an open position in which said spout is in communication with said opening and a closed position in which said spout seals off said opening, the improvement which comprises:

a vent extending through said closure,

a flow actuated inlet check valve means leading into said container mounted on said closure in communication with said vent,

said vent and said inlet check valve means serving to permit air to enter the interior of said container,

a flow actuated outlet check valve means leading from the interior of said container to said opening mounted on said closure,

a tube means attached to said closure in communication with said outlet check valve means and leading to the bottom of said container,

said deformable container being capable of being reduced in internal dimension when force is applied to it and being

capable of returning to its original dimension when force is no longer applied to it,

said deformable container and both of said check valve means cooperating to serve as a pump to dispense the contents of said container through said tube means, said outlet check valve means and said spout when said spout is in said open position and to draw air into said container through said inlet check valve means to replace the dispensed contents as pressure is applied to said container and then released,

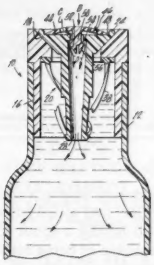
said spout closing off said vent and said opening when said spout is in said closed position, said vent being in communication with the interior of said spout when said spout is in said open position.

3,874,563

APPLICATOR HAVING MULTIPLE VALVE ASSEMBLIES

Gilbert Schwartzman, 20 Wilmot Cir., Scarsdale, N.Y. 10583

Filed June 19, 1973, Ser. No. 371,408
Int. Cl. B65d *37/00*
U.S. Cl. 222—213 **7 Claims**



1. A fluid applicator comprising a retainer ring having a projecting portion, said retainer ring having an opening therethrough forming a valve seat, a valve assembly having a valve head engageable with said valve seat, said valve assembly further including a valve stem extending through said opening, a mounting ring engaging said retainer ring and spring means integrally interconnecting said mounting ring and said valve stem, said stem being hollow forming a chamber, the top of said valve head having an aperture therethrough, said aperture being of less diameter than said chamber forming a shoulder, said valve head having a flange thereon, a disc valve assembly extending through said aperture, the diameter of said disc when in an unstressed condition being greater than the inside diameter of said flange, the peripheral edge of said disc engaging said flange thereby stressing said disc into an upwardly convex position, said disc having at least one bore therethrough, a valve body depending from said disc and having a valve element on said body, said valve element being below said shoulder and being engageable with said shoulder to close said aperture, said aperture and said opening being concentric, said aperture being located inwardly of said opening.

3,874,564

ACCESS LIMITING CLOSURE FOR CONTAINERS

David M. Huneke, 523 Patricia Ave., Chula Vista, Calif. 92010

Filed Nov. 30, 1972, Ser. No. 310,779
Int. Cl. B65d *83/04*
U.S. Cl. 222—363 **6 Claims**

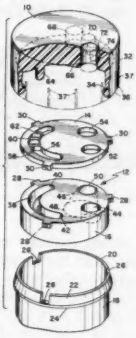
1. A closure for limiting access to a potentially hazardous substance in a container by limiting the quantity of said substance that can be dispensed in a single dispensing cycle and by requiring the user to be capable of following a series of instructions, wherein the improvement comprises:

rotatable cap means for limited rotational movement on said container,

the underside of said rotatable cap means having a transfer chamber sized to receive said substance,

insert means in the opening of said container,

said insert means having guiding means guiding said substance from said container through said insert means and into said transfer chamber after a first inversion of said container,



said insert means additionally having holding chamber means in its upper surface for receiving said substance from said transfer chamber after the return of said chamber to an upright position,

said transfer chamber being movable by rotation of said cap into alignment with said holding chamber means,

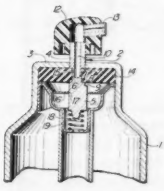
said rotatable cap means further having a dispensing orifice that is movable into alignment with said holding chamber for dispensing said substance from said holding chamber means and through said rotatable cap means.

3,874,565

AEROSOL ATOMIZING DEVICE

Tetsuya Kawashima, Tokyo, Japan, assignor to Ko, Hasino, Ibarak, Japan

Filed Feb. 19, 1974, Ser. No. 443,632
Int. Cl. B65d *83/14*
U.S. Cl. 222—402.14 **1 Claim**



1. An aerosol atomizing device comprising a rotatable valve member having a portion with a cross-section in a shape of a circle lacking a segment thereof and forming a shoulder at one end thereof, a resilient packing member having a central opening which normally seals a passage formed in the valve member and adapted to open the passage when the valve member is actuated, and a dish like stopper means placed under said packing member and having a central opening in a form corresponding to the cross-sectional shape of said one portion of the valve member, whereby when the valve member is pushed down to a certain extent and rotated, the upward

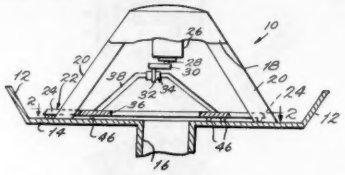
movement of the valve member is prevented thereby maintaining said passage in an open condition.

3,874,566

GRAVITY DISCHARGE APPARATUS

Frank J. Miksitz, Phillipsburg, N.J.; Alfred L. Miksitz, Bethlehem, Pa.; a part interest

Continuation-in-part of Ser. No. 216,105, Jan. 7, 1972, Pat. No. 3,809,286. This application May 6, 1974, Ser. No. 467,558
Int. Cl. B65d *83/06*
U.S. Cl. 222—404 **9 Claims**



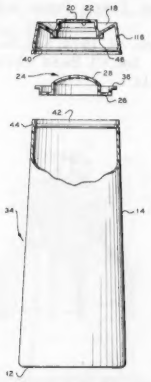
1. Apparatus for passing granular material from a first zone to a lower second zone with the assistance of gravity comprising: a shroud; an apertured feed plate disposed in a horizontal plane below said shroud; and drive means for moving said feed plate in a horizontal orbital path, the relationships among the horizontal dimensions of said shroud and of said feed plate and the radius of said orbital path being such that during orbital movement of said feed plate at least a portion of the peripheral upper surface of said plate extends horizontally beyond the lower end of said shroud.

3,874,567

SNAP ACTION CLOSURE WITH CONCENTRIC ANNULAR FLEX ZONES

Stafford D. Collie, Glen Ellyn, Ill., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 682,260, Nov. 13, 1967, abandoned. This application Apr. 7, 1970, Ser. No. 26,257
Int. Cl. B65d *35/44*
U.S. Cl. 222—499 **1 Claim**



1. A dispensing container containing a material to be packaged comprising:

a bottom wall;

side walls upstanding from said bottom wall;

an integral, one-piece snap acting top wall connecting with said side walls, said top wall having a generally centrally located dispensing opening having a web extending part of the way across said dispensing opening to provide a gripping means and being so contoured as to have two concentric annular integral hinges around said dispensing opening, said hinges being separated by an annular surface, said hinges being capable of bending so that said top wall can assume two stable positions, an open convex position, and a closed concave position;

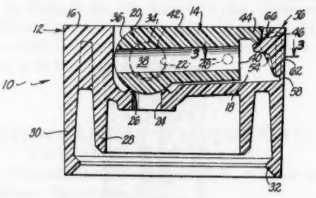
a diaphragm across said container, positioned just below said top wall, said diaphragm having at least one hole around its periphery and further having a solid center section corresponding to the position of said dispensing opening, a generally flat top surface of said center section cooperating with said top to close said containers.

3,874,568

CHILD RESISTANT CLOSURE WITH CAM MECHANISM

Donald H. La Vange, Uxbridge, Mass., and Robert E. Hazard, Kingston, R.I., assignors to Polytop Corporation, Slatersville, R.I.

Filed Nov. 16, 1973, Ser. No. 416,512
Int. Cl. B67d *3/00*
U.S. Cl. 222—505 **8 Claims**



1. In a dispensing closure having a cap which is adapted to be secured to a container and which has an opening extending therethrough and also having a spout rotatably mounted on the cap so as to be capable of being rotated between a closed position in which the spout seals off the opening and an opened position in which the spout is in alignment with the opening, the improvement which comprises:

a cam means movably mounted on said cap so as to be capable of being moved relative to said spout when said spout is in said closed position,

a cam follower means located on said spout so as to be engaged by said cam means when said spout is in said closed position,

said cam means being shaped so that when it is moved as said spout is in said closed position said cam follower means will be engaged by said cam means so as to rotate said spout from said closed position.

3,874,569

RAILWAY HOPPER BUTTERFLY VALVE ACTUATING MECHANISM

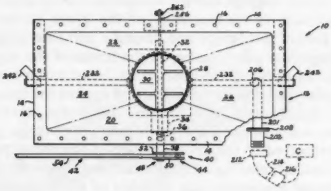
Wallace L. Fossett, Weldon Springs Heights; Jerry D. Waddell, O'Fallon, and Roger L. Akester, St. Charles, all of Mo., assignors to ACF Industries, Incorporated, New York, N.Y.

Filed Apr. 26, 1973, Ser. No. 354,588
Int. Cl. B61d *7/18;* **B65g** *3/14, 69/06*
U.S. Cl. 222—508 **8 Claims**

1. A hopper outlet for use with a railway hopper car comprising:

a bottom discharge opening positioned generally centrally of the width of the railway car; a butterfly valve mounted upon a longitudinally extending first shaft within said discharge opening; said valve adapted to open and close said discharge opening; an arm affixed to said first shaft externally of said outlet; said arm operable by a second shaft extending transversely to at least one side of the car; a contour block mounted on said side of the car to control movement of said second shaft; said second shaft being movable by transverse and longitudinal movement through a plurality of open positions and a closed position

in said contour block to move said valve between a plurality of open positions and said closed position relative to the discharge opening for controlling discharge of lading from the hopper structure; a frame about said bottom discharge opening extending downwardly therefrom generally beneath the valve when in closed position; an elon-



gate bottom cover having its longitudinal axis extending transversely of the car and adapted to fit against the lower surface of said frame; and a parallelogram linkage pivotally connected to the cover and operable at least from said one side of the car to move said cover between open and closed positions.

3,874,570

DISPENSING TUBE HAVING CAP TO BODY ATTACHMENT

Stanley Katzman, 75-18 193rd St., Flushing, N.Y. 10468, and Marvin N. Gordon, 2727 Palisade Ave., Riverdale, N.Y. 10463

Continuation of Ser. No. 113,294, Feb. 8, 1971, abandoned. This application Mar. 1, 1973, Ser. No. 339,338

Int. Cl. B65d *35/44*

U.S. Cl. 222—543 **1 Claim**

1. A material container and dispenser having a body having a hollow interior and an opening in communication with said interior, a closure member for covering said opening and removable therefrom when material is to be dispensed from said interior through said opening, and a flexible member fixedly secured at one of its ends to said body, and means rotatably securing the other end of said flexible member to said closure member for preventing the separation of the latter from the former, said means comprising a circumferential groove formed in the outer peripheral surface of said closure member, and an enlarged portion affixed to said other end of said flexible member and received and retained within said groove for circumferential movement therealong, said cap is threadably engaged with said body when in position over said opening, the circumferential dimension of said groove being less than the circumference of said closure member.

3,874,571

CONTAINERS AND CLOSURES THEREFOR HAVING WIPE CLEAN STRUCTURE

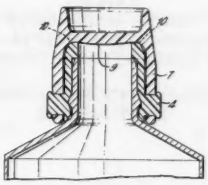
Cyril Edward Higgs, Leeds, England, assignor to Lever Brothers Company, New York, N.Y.

Filed Aug. 2, 1973, Ser. No. 385,124

Claims priority, application United Kingdom, Aug. 7, 1972, 36803/72

Int. Cl. B65d *35/42*

U.S. Cl. 222—558 **5 Claims**



1. A nozzle for a container in combination with a closure to close said nozzle, the nozzle being of molded plastics material and arranged as a snap fit for the container, said nozzle having at least one slot located along a top surface of the nozzle, and the closure being in the form of a stirrup having an end sealing portion carried by legs, and at least one web portion to be engaged in the slot of said nozzle, said legs are pivotally connected to opposed points on said nozzle, said points being located in conjunction with the shape of said nozzle portion so that the stirrup portion can pivot with a wiping action between a closed position where said sealing portion is in sealing contact with the nozzle outlet and an open position where the sealing portion of the stirrup is out of contact with the nozzle.

3,874,572

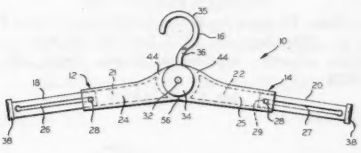
COLLAPSIBLE HANGER

Mary M. McClenning, 900 N. Rush St., Chicago, Ill. 60611

Filed Oct. 13, 1972, Ser. No. 297,233

Int. Cl. A47j *51/10*

U.S. Cl. 223—94 **6 Claims**



1. A garment hanger comprising in combination:

a. a pair of arms rotatable from a garment support-position to a storage-position, said arms each having at the inner end an outer convex edge, a recessed concave edge, an aperture between said convex and concave edges, and a bottom edge below said concave recess edge which abuts the same edge on the other arm in the support position, said convex edge of one arm being received in said concave recess of the other arm, an outer edge of each arm abutting the other when in said storage position;

b. said arms each including a body section having a channel therein and a movable section for sliding within said channel from an extended position to a retracted position, said movable sections having an elongated slot and a stopping means passing through said slot, said stopping means being mounted in said body section;

c. a pulling and pressing means at an end of said movable section being an enlarged portion for gripping;

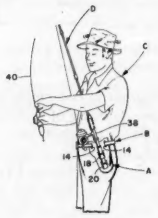
d. a hook having a circular base portion, an outer portion of substantially a C-shape, and an intermediate portion, said intermediate portion being angled to enable said outer portion to lie substantially in the center of the hanger, said base portion having an aperture in the center thereof, and when said arms are in a folded position, said outer portion of the hook being positioned over an inward recess located at outer ends of said body section; and

e. a pivot pin passing through said apertures of the inner ends of said arms and the base portion of said hook.

3,874,573
FISHING ROD HOLSTER

Frederick A. Fruscella, 6179 Eldridge Blvd., and Louis R. Hanzel, 24680 Shekborne, both of Bedford Heights, Ohio 44146

Filed Aug. 1, 1973, Ser. No. 384,437
Int. Cl. A45f *5/00*
U.S. Cl. 224—5 E **8 Claims**

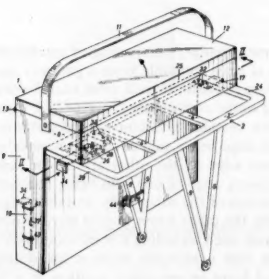


1. A one-piece fishing rod holster comprising; a substantially flat base plate including an upper portion having belt attaching means integral therewith for attaching said plate to a belt, upwardly opening loop means integral with said plate and extending outwardly therefrom for receiving a fishing rod handle, said loop means including a pair of longitudinally-spaced loops, and said plate having openings therethrough spanning each said loop and being continuous between said loops.

3,874,574
PANNIER FOR CYCLES

Victor Heise, 73, Place des Ecoles, 62350 Saint Venan, France

Filed Sept. 20, 1973, Ser. No. 398,979
Claims priority, application France, Sept. 25, 1972, 72.33828
Int. Cl. B62j *9/00*
U.S. Cl. 224—31 **6 Claims**

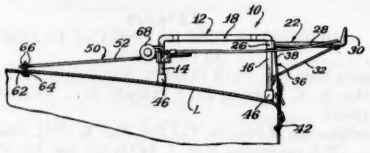


1. A pannier type device, for fixing removably to a cycle rear luggage carrier of the kind having a horizontal frame with crossbars and supported by lateral uprights for connection to two legs of a rear fork of the cycle, said device having a transverse vertical section substantially in the form of an inverted "L" whose horizontal upper part is fitted with means for fixing to the frame of the luggage carrier, said fixing means comprising upper strips to engage under cross members of said frame, the vertical lower part of the device carrying a lower strip to engage the inner surface of an upright of the luggage carrier, wherein a first of said upper strips for fixing the device to the frame of the luggage carrier comprises a bent plate attached longitudinally to an extremity of the lower surface of said upper part of the device and having a part to engage under a first transverse side member of the frame of the luggage carrier and another part to bear on the inner surface of the said first transverse side of the frame and against the inner portion of the longitudinal side of the said frame corresponding thereto, and wherein a second of said upper strips in detachably connected to the lower surface of the upper part of the device and situated against the inner and lower portion of the said second transverse side member of the frame of the luggage carrier and also against the inner portion of the corresponding longitudinal side of this frame, said lower attachment strip pointing in the same direction as said fixed upper strip.

3,874,575
BICYCLE RACK

Steven A. Wasserman, 4920 Chase, Skokie, Ill. 60076

Filed Nov. 10, 1972, Ser. No. 305,349
Int. Cl. B60r *9/10*
U.S. Cl. 224—42.03 B **5 Claims**



1. A rack for mounting a bicycle on to a portion of an automobile with a front edge and a rear edge while discouraging theft of the bicycle and rack, said rack comprising, in combination, a rigid support member having a front portion and a rear portion, means rigidly mounted on said rear portion of said support member and projecting rearwardly therefrom for supporting at least one bicycle thereon, means for connecting said rear portion of said support member to the rear of said automobile portion, means for interconnecting said front portion of said support member to the front of said automobile portion, said front interconnecting means including a pair of rigid interconnecting rods having means at one end thereof for interconnection to said automobile portion and having means at the other end thereof for interconnection to said support member, a pair of adjustable plate members receiving said rod members and engaging the front of said support members, flexible elongated means engaging said bicycle, and means for interlocking said flexible member to said support member for discouraging theft of said bicycle.

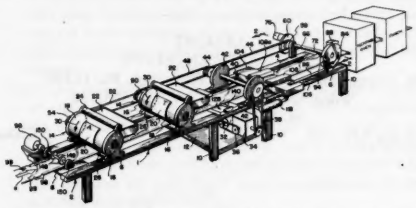
3,874,576
PRINTING MACHINE

George Ross Vines, 2459 Fir St., Glenview, Ill. 60024

Division of Ser. No. 250,180, May 4, 1972, Pat. No. 3,762,322.
This application Sept. 10, 1973, Ser. No. 395,921
Int. Cl. B65h *17/38*
U.S. Cl. 226—59 **2 Claims**

1. In a machine of the character described, means for advancing a sheet of material, a carrier having spring fingers for engaging notches at the sides of said sheet, means for moving said carrier forwardly from an initial position through a predetermined distance to advance said sheet said predetermined distance, means for retracting said carrier to said initial posi-

tion, said carrier-moving means including a rotatable member, a flexible structure trained over said rotatable member and connected to said carrier, means for rotating said rotatable member an amount sufficient to advance said carrier said predetermined distance and said means for retracting said carrier comprising means engaging said carrier and operable to rotate said member in the opposite direction an amount sufficient to retract said carrier to said initial position, means



for applying retrograde force to said sheet when said carrier has advanced said predetermined distance, said means for applying retrograde force being inoperative on said sheet when the carrier is moving forwardly, and means including another spring finger engaging said notches and cooperating with said means for applying the retrograde force for engaging said sheet in a manner to locate said sheet in a predetermined position of registry preparatory to the next advance of the sheet.

3,874,577

DEVICE FOR TEMPORARILY STOPPING TAPE TRAVEL IN CARTRIDGE TYPE TAPE RECORDER

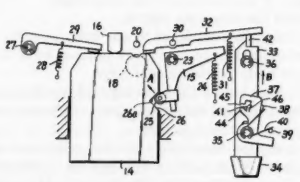
Shigeru Matsumoto, Hiratsuka, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Kanagawa-ken, Japan

Filed June 9, 1972, Ser. No. 261,336

Claims priority, application Japan, June 9, 1971, 46-48696; June 9, 1971, 46-48697

Int. Cl. B65h *17/20*

U.S. Cl. 226—90 **4 Claims**



1. A device for temporarily stopping the travel of a tape in a cartridge-type tape recorder, said device comprising: means for receiving a cartridge inserted thereinto, said cartridge containing therewithin an endless magnetic tape and a pinch roller and having in a side part thereof a V-shaped recess; a capstan for causing said tape to travel, said pinch roller pressing against the capstan over the tape interposed therebetween when the cartridge is thus inserted; means for driving the capstan in rotation; pressing means adapted to engage the cartridge at said V-shaped recess and operating to impart to the cartridge a pushing force in the direction to cause the pinch roller to press thus against the capstan and to hold the cartridge in the pushed state; and return means for temporarily pushing out the cartridge, counter to and overcoming the pushing and holding force of said pressing means, from its pushed and held state but not to an extent whereby the pressing means would be completely dislodged from its pushing force imparting state, said return means comprising a push button, a sliding bar for undergoing sliding movement upon being actuated by way of said push button, a return lever contacting at one end thereof the innermost front surface of the cartridge thus inserted and operating, when the push button is pressed inward to cause the sliding bar to slide inward, to rotate and push, at said other end, the cartridge counter to and overcoming the pushing and holding force of the pressing means thereby to return the cartridge slightly out from its fully inserted state, and locking means for locking the sliding bar in its position at the end of said sliding movement.

3,874,578

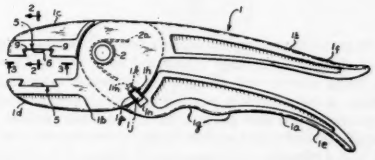
JAW MEMBER-DIE MEMBER ASSEMBLY

Chester B. Derr, South Woodstock, Conn., and Bernhard P. Nysten, Aachen, Germany, assignors to William Prym, Inc., Dayville, Conn.

Filed Apr. 19, 1974, Ser. No. 462,313

Int. Cl. B25c *7/00*

U.S. Cl. 227—144 **7 Claims**



1. A jaw member-die member assembly, for releasably and exchangeably holding and aligning in the jaw member a plurality of die members for attaching various fastener members to a fabric, comprising

a jaw member having a base surface and side walls forming a dovetail guide slot,

a plurality of die member means for holding selectively fastener and fabric-working members, each of said die member means having a frustoconical base,

each of said frustoconical base having a diametric periphery substantially complementary to the transverse cross-section of said dovetail guide slot, and

means on said jaw members for holding said frustoconical base in position against shifting in said guide slot.

3,874,579

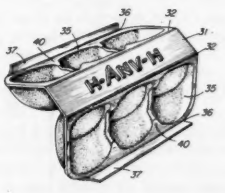
PACKAGING SUPPORT TRAY

Morell J. Holden, Jr., Canandaigua, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 19, 1973, Ser. No. 342,561

Int. Cl. B65d *1/00*

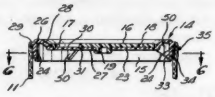
U.S. Cl. 229—2.5 **7 Claims**



1. A packaging tray comprising a substantially planar top member, said top member having flexibly hinged along opposite longitudinal edges thereof two side wall members, said side wall members being adapted to depend downwardly from said planar top member, said side wall members being further characterized by having a plurality of inwardly extending

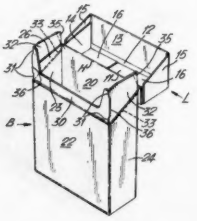
recesses in side by side relationship, said recesses being substantially coextensive in height with the height of said side wall members.

3,874,580
CONTAINER END CLOSURE
Albert J. Weatherhead, III, Cleveland Heights, Ohio, assignor to Weatherchem Corporation, Twinsburg, Ohio
Filed Feb. 1, 1973, Ser. No. 328,876
Int. Cl. B65d *3/10*
U.S. Cl. 229—5.5 **10 Claims**



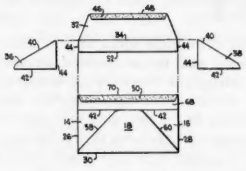
1. In combination, an end closure and a fiber tube, said fiber tube including a generally cylindrical wall, and said end closure being plastic and including a laterally extending end portion, an annular skirt portion extending axially from said end portion, said skirt portion having an inner surface and a generally smooth outer surface being received within said tube wall, and a plurality of locking means disposed in positions of remotely spaced adjacency holding said skirt portion in said tube wall, each of said locking means including a plurality of axially spaced locking barbs, each of said barbs extending radially outwardly from said generally smooth outer surface and terminating at a sharp edge, reinforcing strut means extending from said end portion to said inner surface solely at a location immediately adjacent said locking barbs and preventing radially inward deformation of said locking barbs, said locking barbs locally deforming the portion of said tube wall adjacent said locking barbs radially outwardly to stretch said portion of said tube wall to a position radially outwardly of the remaining portions of said tube wall intermediate said barbs, and the resilience of said stretched tube wall urging said fiber tube onto said locking barbs whereby said locking barbs lock said end closure onto said fiber tube.

3,874,581
BOX OR PACKET
Austin L. Fox, and William A. A. Jones, both of London, England, assignors to Molins Limited, London, England
Filed June 21, 1973, Ser. No. 372,367
Claims priority, application United Kingdom, June 30, 1972, 30629/72
Int. Cl. B65d *5/66*
U.S. Cl. 229—44 CB **7 Claims**



1. A hinged lid packet with a lid portion hinged to a body portion, the body portion comprising a front wall including an integral recessed panel extending upwardly from the front wall, a rear wall, a pair of side walls each formed by an inner flap and by an outer flap, one of said flaps extending from the rear wall and the other of said flaps extending from the front wall, the recessed panel being narrower than the front wall and being recessed towards the interior of the packet and disposed substantially parallel to said front wall so that when the packet is closed the panel lies wholly within the lid portion, and a pair of side flaps extending from the sides of the recessed panel in a direction parallel to the respective side walls, the lower part of each side flap being sandwiched between the inner and outer flaps of the respective side walls.

3,874,582
REUSABLE ENVELOPE
Yen Wang, 6883 Reynolds St., Pittsburgh, Pa. 15208
Filed Apr. 30, 1973, Ser. No. 355,820
Int. Cl. B65d *27/06, 27/34*
U.S. Cl. 229—73 **9 Claims**



1. An envelope comprising,
a body portion having upper and lower edges and side edges with a window opening provided adjacent said lower edge,
a pair of opposed side flaps integrally connected to said body portion, each of said side flaps demarcated from said body portion by a score line along one of said body portion side edges,
a bottom flap integrally connected to said body portion, said bottom flap demarcated from said body portion by a score line along said lower edge and having side edges,
first adhesive means for securing said bottom flap in overlying relation to each of said side flaps folded along said score line of said body portion side edges,
a first pocket for receiving inserts,
a top flap integrally connected to said body portion, said top flap demarcated from said body portion by a score line along said body portion upper edge,
second adhesive means for securing said top flap in overlying relation to said side flaps and said body portion to thereby seal said first pocket,
severing means for detaching a portion of each of said side flaps together with said top flap and an upper portion of said body portion from the remaining body portion,
a second pocket for receiving inserts,
third adhesive means for securing the top portion of said remaining body portion in overlying relation with the remaining portions of said side flaps and said bottom flap to thereby seal said second pocket for reuse of said envelope.

3,874,583
MAIL RECEPTACLE
Ralph E. Moll, 643 South St., Casper, Wyo. 82601
Filed Apr. 12, 1973, Ser. No. 350,585
Int. Cl. A47g *29/12*
U.S. Cl. 232—17 **3 Claims**

1. A mail receptacle, comprising:
a housing having a bottom wall, a front wall with hinge means disposed at the upper end thereof, and a curved upper wall extending over and forwardly of the upper end of said front wall to define a first opening in the front

upper portion of said housing, said upper wall having a center approximately at said hinge means, said front wall extending upwardly and forwardly from said bottom wall at an acute angle to a vertical plane, and said housing further comprising a rear wall extending upwardly and outwardly from said bottom wall in substantially parallel relation to said front wall, said bottom wall connecting said front wall and said rear wall;

a door member disposed within said first opening and being pivotally mounted on said housing by said hinge means; said door member having a front panel and a rear panel spaced from said front panel, said front and rear panels extending substantially radially outwardly from said hinge means;

said door member being movable between an open position wherein said front panel extends outwardly of said housing to receive mail thereon and said rear panel is positioned to close said first opening, and a closed position wherein said front and rear panels are disposed within said housing and said front panel is positioned to close said first opening;

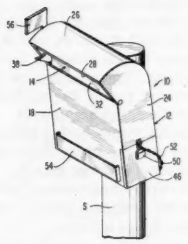
said door member further comprising side panels disposed adjacent opposite sides of said housing and extending from said front panel to said rear panel, said side panels being of sectorshape, and a flange extending upwardly from the outer end of said front panel and extending between said side panels to retain mail deposited on said front panel when said door member is disposed in said open position;

said housing having a second opening in a lower portion thereof for removal of mail therefrom, and closure means for said second opening;

means for locking said closure means;

support means for said receptacle, said support means comprising a substantially L-shaped bracket having a lower leg fixedly secured to said bottom wall and an upper leg extending substantially vertically upwardly and defining a wedge-shaped space with the adjacent outer surface of said inclined rear wall for the reception of large articles of mail that cannot conveniently fit within said first opening of said housing, said wedge-shaped space being open at its upper end so as to be adapted to receive articles of greater height than said housing; and

a receptacle portion secured to the lower outer portion of said front wall of said housing for the reception of outgoing mail, said receptacle portion having a closed bottom and an open upper end, the upper and front walls of said housing extending over and forwardly of said receptacle portion to serve as a protective cover therefor, owing to the forward inclination of said front wall.



3,874,584

FORECASTING APPARATUS

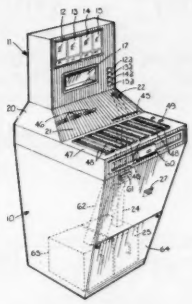
Terence Patrick Grattan Foley, Gattax Farm, Outhill, Studley, England

Continuation of Ser. No. 285,191, Aug. 31, 1972, abandoned. This application Mar. 4, 1974, Ser. No. 448,024

Claims priority, application United Kingdom, Aug. 31, 1971, 26191/71

Int. Cl. B26f *1/04;* **B44b** *5/00*

U.S. Cl. 234—128 **1 Claim**



1. Apparatus for gambling on a selected one of a plurality of different sporting events comprising, in combination; a housing having an upper part and a lower part; a display window in the upper part of the housing; a set of display coupons, one appropriate to each sporting event, provided behind said display window; means operable by the user of the apparatus for displaying a selected display coupon in said display window; a record card magazine in the interior of the lower part of the housing; a plurality of identical record cards in said magazine, each record card having the same indicia premarked thereon and each record card further having an adhesive backed transparent film detachably secured to one face thereof; means provided in said lower part of the housing to feed said record cards one by one to a punching station; punch means disposed at said punching station operable to punch holes through a record card and its transparent film; wherein each of said display coupons has premarked thereon indicia identical to that on each record card, and wherein exteriorly of the housing, a number of sets of copy coupons are provided, there being one set for each sporting event, each of said copy coupons having premarked thereon indicia identical to that on said record cards, whereby the transparent film can be peeled off a respective record card and affixed to a copy coupon to provide a personal record.

3,874,585

NUMERICAL REGISTERING DEVICE

Donald R. Alexander, R.R. 1, Box 291, Conway, Ark. 72032, and Carl W. Johnson, Neenah, Wis., assignors to said Alexander, by Johnson

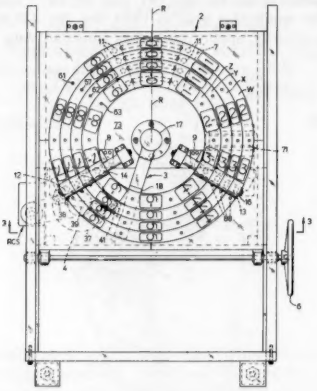
Filed Apr. 17, 1974, Ser. No. 461,645

Int. Cl. G06m *1/00;* **G06c** *15/26*

U.S. Cl. 235—1 C **12 Claims**

1. A numerical registering device comprising a support; a concentric radial assembly of decimal rings mounted on said support for relative rotation about a common axis; an indexing arm mounted on said support for pivotal advance and return strokes about the axis of said decimal rings; selectively engageable and disengageable motion transmitting means operatively interposed between said indexing arm and said decimal rings; a control system for engaging and disengaging said motion transmitting means whereby said rings may be rotated step by step upon successive forward strokes of said indexing arm and left in indexed positions during the return strokes of

said indexing arm; and selector means for adjusting said control system to either an automatic operating condition which will provide step by step rotation of said decimal rings in



predetermined order, or to any one of a number of alternative operating conditions which will provide step by step rotation of any selected one of said decimal rings independently of the others.

3,874,586

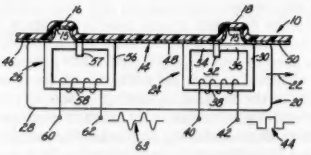
INFORMATION-CARRYING ARTICLE AND READING APPARATUS AND METHOD

Francis C. Foote, Rocky River, and Robert L. Carper, Eastlake, both of Ohio, assignors to Addressograph-Multigraph Corporation, Cleveland, Ohio

Filed Dec. 18, 1972, Ser. No. 316,319

Int. Cl. G06k *7/08*; **G11b** *5/82*; **G06k** *19/06*

U.S. Cl. 235—61.11 D **8 Claims**



1. A method of reading an information carrying member having an information area on one side thereof with raised characters being defined by first portions offset from adjacent portions comprising: scanning the member with a first field effect reader with relative movement therebetween along a first path corresponding with a first strip area having a plurality of field effect portions encoded to provide a train of output signals of alternately opposite sense with the output signals being disrupted in accordance with the said offset portions in said first strip area, scanning with a second reader a second path simultaneously with scanning of said first path by said first reader, said second path corresponding with a second strip area extending through an area of said member remote from said raised characters, said second strip area also having a plurality of field effect portions which are encoded with fields and defining a clock track on said member to provide a train of clock pulse signals of alternately opposite sense, and utilizing said clock pulse signals to identify the position of the said first reader along the first path, said clock pulse signals along with said output signals utilized for identifying the raised characters on said member.

3,874,587

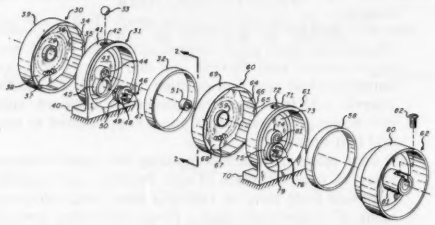
MECHANICAL COUNTER SYSTEM FOR ALTIMETRIC DISPLAYS

Harold J. McGann, Phoenix; John F. Whalen, and Boyd K. Williams, both of Scottsdale, all of Ariz., assignors to Sperry Rand Corporation, New York, N.Y.

Filed May 6, 1974, Ser. No. 467,050

Int. Cl. G06c *25/00*, *9/00*

U.S. Cl. 235—131 R **14 Claims**



1. Numerical display means for displaying symbols representative of the rotational position of shaft means comprising: casing element means having journal means for supporting said shaft for rotation therein,

first drum display means mounted for rotation with respect to said casing element means on said shaft means,

second drum display means mounted for rotation with respect to said casing element means on said shaft means, said casing element means having first annular flange means adjacent the periphery thereof,

said first drum display means having second annular flange means adjacent the periphery thereof and projecting under said first annular flange means,

said second drum display means having third annular flange means adjacent the periphery thereof and projecting over said first annular flange means,

flexible band means disposed in the region between said first and second annular flange means, and

detent means responsive to flexing of said flexible band means for selectively and fixedly engaging said first and third annular flange means against relative rotation about said shaft means.

3,874,588

APPARATUS AND METHOD FOR IMPROVING WATER DISTRIBUTION FROM ROTARY SPRINKLERS

Charles J. Flynn, Glendora, Calif., assignor to Anthony Manufacturing Corporation, Azusa, Calif.

Filed May 28, 1974, Ser. No. 473,767

Int. Cl. B56b *17/04*

U.S. Cl. 239—11 **11 Claims**

6. A method for enhancing the fall out distribution of water from the nozzle of a rotary sprinkler over the area to be irrigated, comprising the steps of:

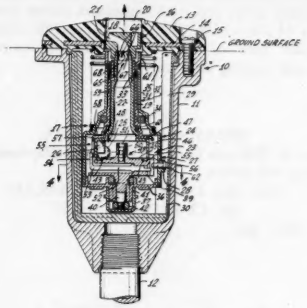
imparting a generally uniform and orderly spinning motion in one direction to water flowing through the sprinkler and prior to entering the nozzle;

selectively reversing the direction of the spinning motion imparted to the water prior to entering the nozzle;

permitting the water to which the spinning motion in said one direction has been imparted to pass through the nozzle in said spinning condition whereby upon leaving the nozzle, the spinning water will expand rapidly for controlled and early fall out; and

cancelling the spinning motion of the water to which said reverse direction of spinning motion has been imparted prior to entering the nozzle is that the water passing

through the nozzle is collimated whereby upon leaving the nozzle, the collimated water will tend to remain in a



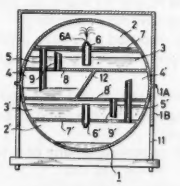
tight stream for maximized distance of throw from the nozzle before fall out.

3,874,589

SELF-ACTING WATERSPOUT DEVICE

Hiroshi Yamada, Tokyo, Japan, assignor to Takayuki Masuda, Tokyo, Japan

Filed May 15, 1974, Ser. No. 470,025
Claims priority, application Japan, May 21, 1973, 48-55542
Int. Cl. B05b *17/08*
U.S. Cl. 239—21 **8 Claims**



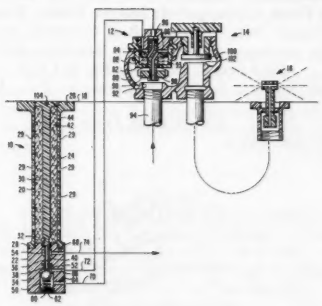
1. Self-acting waterspout device comprising a hollow body adapted to be held either in a first vertical position with its one end positioned at the topside of said body and in a second vertical position inverted upside down with respect to said first vertical position with the opposite end positioned at the topside of said body, a pair of transparent spout chambers each defined by a portion of the wall of said body and a first partition provided in said body with one of said spout chambers located at said one end of said body while the other spout chamber is located at said opposite end of said body, a pair of pressurizing chambers each located inside of the respective spout chamber within said body and defined by a portion of the wall of said body, said first partition and a second partition provided in said body, at least a water storage chamber located inside of said pair of pressurizing chambers within said body and defined by a portion of the wall of said body and said second partitions, a pair of spout pipes each having a jet nozzle at its one end and secured to said first partition with said jet nozzle located in the respective spout chamber and with its other end opening in said pressurizing chamber adjacent to said second partition, a pair of circulating pipes each secured at its one open end to the respective first partition for communication with the respective spout chamber and extending through the respective pressurizing chamber and said second partition into said water storage chamber with the other end terminating adjacent to the opposite wall of said water storage chamber, a pair of water feeding pipes each secured at its one open end to said second partition for communication with said water storage chamber and extending into the respective pressurizing chamber with its other end terminating adjacent to the respective first partition, and a predetermined amount of liquid contained in said body, thereby permitting water jet to be continuously effected through either one of said jet nozzles located at the topside of said body by placing the same in either of said first and second vertical positions so that liquid is contained in one of said pressurizing chambers then located at the upside of the other by virtue of a preliminary liquid supply given from one of said spout chambers located at the upside of the other through said circulating pipe to said water storage chamber.

3,874,590

MOISTURE RESPONSIVE APPARATUS FOR CONTROLLING MOISTURE CONTENT OF SOIL

William H. Gibson, 13882 Tustin East Dr., Apt. 70, Tustin, Calif. 92680

Filed Oct. 19, 1973, Ser. No. 407,928
Int. Cl. A01g *27/00*
U.S. Cl. 239—63 **56 Claims**



1. A moisture responsive sensor unit comprising:

a tubular moisture responsive sensing element having a first end and a second end, said sensing element being expansible longitudinally as a function of the amount of moisture absorbed by said element; and

an actuator, at least a portion of which is disposed within said sensing element, having a first end coupled to the first end of said sensing element and a second end, the dimensions of said actuator being substantially unaffected by moisture, said second ends of said sensing element and said actuator being adapted to be coupled to relatively displaceable portions of a hydraulic control signal generating means.

3,874,591

EMITTER VALVE FOR SOIL IRRIGATION

David Werner, Los Angeles, Calif., assignor to Salco Products Incorporated, Los Angeles, Calif.

Continuation of Ser. No. 110,714, Jan. 28, 1971, abandoned. This application Feb. 9, 1973, Ser. No. 331,128
Int. Cl. B05b *15/00*
U.S. Cl. 239—106 **28 Claims**

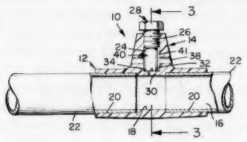
2. An irrigation system comprising:

a source of water for furnishing water under pressure;

an emitter valve for supplying controlled amounts of water carrying solid particulate matter under pressure from said source of water to soil in droplet form;

said emitter valve including fluid inlet means coupled to said source, fluid outlet means opening to the soil, and fluid regulator means including an end wall and joining said outlet means and said inlet means, and flow controlling means coupled to said fluid regulator means, including a deformable element seated on said end wall and including means for swirling the water, and having means

for exerting on said element a counterpressure to the water pressure and for permitting substantially unimpeded flow and the supply of controlled amounts of water carrying the solid particulate matter from said source to the soil.



3,874,592

BURNER FOR THE PARTIAL OXIDATION OF HYDROCARBONS TO SYNTHESIS

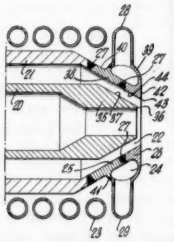
Karl Buschmann, Neustadt; Josef Diewald, Ludwigshafen; Klaus Feind, Limburgerhof; Juergen Friebe, Wachenheim, and Arnulf Jeck, Neustadt, all of Germany, assignors to Texaco Development Corporation, New York, N.Y.

Filed Dec. 4, 1972, Ser. No. 311,613

Claims priority, application Germany, Dec. 15, 1971, 2162253

Int. Cl. B05b *15/00*

U.S. Cl. 239—132.3 **2 Claims**



1. A burner for use in introducing raw materials into the reaction zone of a gas generator where at an autogenous temperature in the range of about 700° to 1,900°C. and a pressure in the range of about 1 to 250 atmospheres by the partial oxidation of a hydrocarbon fuel with a free-oxygen containing gas optionally in the presence of a temperature moderating gas a gaseous mixture comprising hydrogen and carbon monoxide is produced said burner comprising a central tubular conduit and central nozzle extending therefrom disposed along the longitudinal axis of said burner through which a first stream is passed, said central nozzle terminating in a single unobstructed circular orifice; an outer coaxial concentric conduit and outer converging frusto-conically shaped nozzle extending therefrom radially disposed from said central conduit and central nozzle along their length for simultaneously introducing a second stream into said reaction zone, said outer nozzle terminating in a single unobstructed circular orifice located at the outer most face of the burner; an annular cooling chamber containing no internal baffles encircling the downstream tip of said burner and having an inside wall in common with said outer nozzle and an outside wall comprising a tubular ring of approximately semicircular cross section having an outermost tip portion at the burner face with a wall thickness in the range of from about 1 to 5 mm, and wherein said inside wall comprises back and front substantially converging frusto-conically shaped tapered sections with the rear end of said back section being welded to the downstream end of said outer coaxial concentric conduit and the forward end of said back section being welded to the rear end of said front section with portions of each of said welds facing the outside surfaces of said inner tube and central nozzle and being recessed from the burner face to prevent direct radiation from said reaction zone; and inlet and outlet means joined to the periphery of the cooling chamber on opposite sides near the downstream face of said burner for circulating coolant through said cooling chamber.

3,874,593

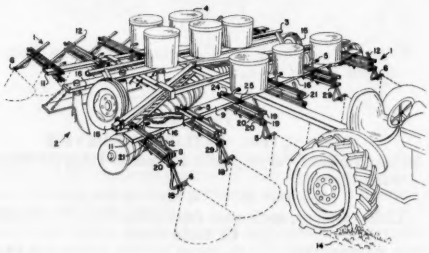
SPRAY SUPPORT FRAME

Theodore G. Wilt, c/o T. G. Wilt Farm Employment, Box 397, Shelbina, Mo. 63468

Filed Oct. 23, 1973, Ser. No. 408,438

Int. Cl. B05b *1/20, 13/02*

U.S. Cl. 239—166 **6 Claims**



1. A spray support frame for use in an agricultural apparatus, said spray support frame comprising:

a. first and second opposed rails each positioned in engagement with a support member on an agricultural apparatus;

b. means for urging each of said first and second rails into and maintaining same in clamped engagement with the support member;

c. an arm pivotally mounted on one of said first and second rails;

d. spray means supported on said arm;

e. means communicating said spray means with a source of spray material; and

f. means on the other of said first and second rails for frictionally engaging said arm to retain said arm and said spray means thereon in a selected position relative to a ground surface.

3,874,594

TANK CLEANING MACHINE WITH SELECTIVE WASH PROGRAMMING

Kenneth John Hatley, 26 Holmwood Ave., Sanderstead, Surry, England, assignor to Butterworth System Inc.

Filed Apr. 25, 1973, Ser. No. 354,508

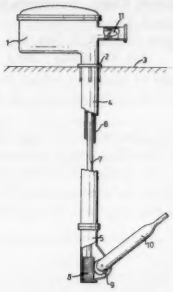
Claims priority, application United Kingdom, Apr. 28, 1972, 19907/72

Int. Cl. B05b *3/04*

U.S. Cl. 239—227 **17 Claims**

1. A tank washing machine suitable for cleaning tanks of oil tankers, comprising a wash liquid supply pipe in communication with a nozzle housing rotatable about its longitudinal axis, a nozzle fixed to said nozzle housing, said nozzle being rotatable about an axis at an angle to its own longitudinal axis and at an angle to the axis of rotation of said housing, a turbine having turbine blades actuated by the flow of wash liquid from said wash liquid supply pipe, means operably driven in response to the impingement of said wash liquid on said turbine blades and including program means for causing said tanks to be cleaned in accordance with a predetermined programmed wash cycle, said program means operably connected for

changing the speed of said turbine, and means connecting said turbine to drive said nozzle and nozzle housing for automatically varying the speed of each of said nozzle housing and said nozzle during operation as a function of said predetermined programmed wash cycle of said program means.



3,874,595

ATOMIZER FOR SPRAYING A LIQUID MEDIUM

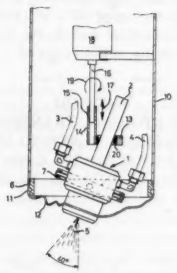
Fritz Rindisbacher, Basel, Switzerland, assignor to Aeromatic AG, Muttenz, Switzerland

Filed May 31, 1974, Ser. No. 475,073

Claims priority, application Switzerland, June 4, 1973, 8021/73

Int. Cl. B05b *3/02;* **B67d** *5/06*

U.S. Cl. 239—227 **7 Claims**



1. An atomiser for spraying a liquid medium comprising:

a nozzle body,

connections on the nozzle body for the liquid medium and for compressed air,

mounting means for the nozzle body to permit free movement of the nozzle body,

a guide shaft mounted on the nozzle body,

an eccentrically mounted follower which engages the guide shaft,

drive means for driving the follower whereby the nozzle body is moved in a predetermined path.

3,874,596

FLUID DISPENSING DEVICE

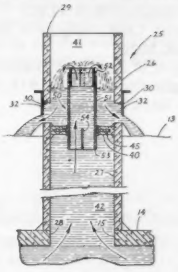
Benjamin Baxter, P.O. Box 488, Fowler, Calif. 93625

Filed Feb. 11, 1974, Ser. No. 441,136

Int. Cl. B05b *15/00*

U.S. Cl. 239—542 **10 Claims**

1. A device for control of fluid discharge from a substantially upright riser connected to a source of fluid and having a fluid discharging opening comprising a mounting plate secured in the riser and extending transversely thereof intermediate the source and the opening and having a passage providing a substantially vertical axis; and a telescopic tubular means endwardly adjustable to regulate the hydrostatic head of fluid pressure required for fluid discharge through the riser from the source, said tubular means comprising a tubular member having an end portion compressible by insertion in the passage to mount said tubular member on the mounting plate in upright relation in the riser and a sleeve slidably received on the tubular member remote from the compressible end portion thereof to provide said telescopic endward adjustment of the tubular means.



3,874,597

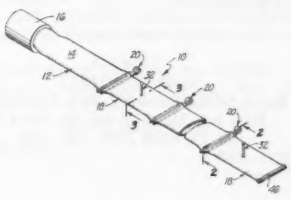
FLUID DISTRIBUTION STRUCTURES

James B. Stephens, La Crescenta; William A. Owen, and Charles G. Miller, both of Pasedena, all of Calif., assignors to Westates Space-Era Products, Inc., South El Monte, Calif.

Filed June 20, 1974, Ser. No. 481,050

Int. Cl. B05b *15/00*

U.S. Cl. 239—542 **8 Claims**



1. A fluid distribution structure which comprises:

an elongated, flexible conduit having ends, one of said ends being adapted to be connected to a source of fluid under pressure and having sides which collapse towards one another when there is no pressure within said conduit.

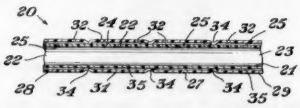
a plurality of pressure responsive closure means located along the length of said conduit, each of said closure means being capable of closing off the interior of said conduit so as to divide the interior of said conduit into a plurality of isolated sections.

at least one hole leading through said conduit from the interior of each of said sections,

a flow control member associated with each of said holes, each of said flow control members including shank extending through the hole associated with it and a head capable of fitting against the exterior of said conduit when said conduit is expanded as a result of fluid under pressure being located within the interior of said conduit, said holes being dimensioned relative to said shanks so

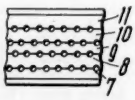
that fluid can escape from the interior of said conduit through said hole when such fluid is present within said conduit under pressure.

3,874,598
IRRIGATION TUBE
Carl B. Havens, Fresno, Calif., assignor to The Dow Chemical Company, Midland, Mich.
Continuation-in-part of Ser. No. 293,822, Oct. 2, 1972, abandoned. This application Dec. 17, 1973, Ser. No. 425,576
Int. Cl. B05b *15/00*
U.S. Cl. 239—542 **8 Claims**



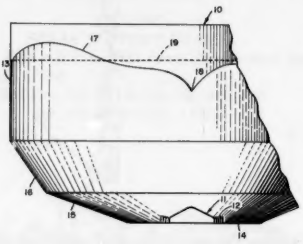
1. An irrigation tubing comprising
a first or inner conduit, the inner conduit having generally constant wall thickness,
a plurality of perforations disposed in the wall of the inner conduit providing a plurality of passages through the wall thereof,
an outer adjacent conduit enclosing the inner conduit, the adjacent conduit having
a plurality of openings passing through the wall thereof, the total cross-sectional area of the openings per unit length of the conduits being greater in the outer conduit than in the inner conduits, the inner and adjacent conduits being of flexible plastic material readily deformable to a flat ribbon-like shape, with the further limitation that
the outer adjacent tube has spaced apart annular regions of reduced diameter and the inner tube and the outer tube define a plurality of generally annular elongated compartments therebetween.

3,874,599
BURNER NOZZLE
Theodor Roger, Schluchterheide 2, Berg. Gladbach, Germany
Filed July 31, 1973, Ser. No. 393,119
Int. Cl. B05b *1/04, 1/06, 1/16*
U.S. Cl. 239—557 **4 Claims**



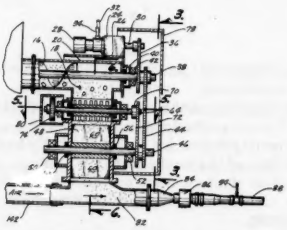
1. A burner nozzle for gaseous flow comprising a plurality of outer rows of sections; at least one inner section between the outer rows of sections; halves of nozzle bores formed on both outer surfaces of the at least one inner section facing the outer rows of sections and on surfaces of the outer rows of sections facing the at least one inner section, the distance from one of the halves of nozzle bores to another being equal to at least the diameter of the bore and the outer rows of sections and the at least one inner section being movable against each other and transversely to the halves of the nozzle bores to adjust gaseous flow.

3,874,600
PULPER TANK
Robert Blakeley Honeyman, Carmel, Calif., and Robert Lee Crawford, Portland, Oreg., assignors to Morden Machines Company, Portland, Oreg.
Filed June 20, 1973, Ser. No. 371,745
Int. Cl. B04c *5/081*
U.S. Cl. 241—46.17 **1 Claim**



1. A pulper tank having an upright, generally cylindrical sidewall spaced above a generally horizontal bottom wall of similar diameter than said cylindrical sidewall, a rotor mounted above said bottom wall and below said cylindrical sidewall, and at least two upwardly divergent generally frusto-conical walls, one above the other, coupling said bottom wall with said cylindrical sidewall, the lower of said frusto-conical walls forming a first exterior angle in the range 20° – 25° with the horizontal, a second exterior angle being that between the upper and lower frusto-conical walls and being at least equal to said first angle, and in the range 30° – 35°, a third exterior angle being that between the upper frusto-conical wall and said upright cylindrical wall and being at least equal to said second angle, and in the range 30° – 35°, the ratio of the height of said upper frusto-conical wall to the height of said lower frusto-conical wall being in the range of 2.5 to 1.5.

3,874,601
APPARATUS FOR STORING, TRANSPORTING, MIXING AND DELIVERING BLASTING MATERIAL
Floyd R. Swanson, Jr., P.O. Box 508, Cedar Falls, Iowa 50613
Filed May 18, 1973, Ser. No. 361,497
Int. Cl. B02c *21/02*
U.S. Cl. 241—101.7 **13 Claims**



1. An apparatus for storing, transporting, mixing and delivering blasting material to a bore hole, comprising,
a wheeled frame means having a first storage tank mounted thereon and having a first material conveyor means extending from the lower portion thereof,
a lump breaker apparatus positioned below the discharge end of said first material conveyor means and being in communication therewith and adapted to break the lumps in the material being supplied thereto by said first material conveyor means.

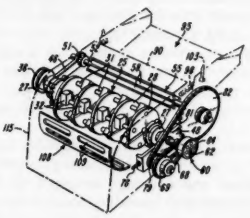
an air lock apparatus positioned below said lump breaker apparatus and being in communication therewith for permitting said material to pass therethrough,
an air conduit in communication with said air lock apparatus and being in communication with a source of air under pressure so as to convey the material being supplied thereto,
a source of fuel oil under pressure in communication with said air conduit for injecting fuel oil into the air material mixture,
means for driving said first material conveyor means, said lump breaker apparatus and said air lock apparatus,
and control means for controlling the operation of said conveyor means, said source of air under pressure and the injection of said fuel oil into said air material mixture.

3,874,602

CHIPPER APPARATUS FOR ARTICLES SUCH AS TREE LIMBS AND THE LIKE

Joseph J. Ciriegio, Piqua, Ohio, assignor to Piqua Engineering, Inc., Piqua, Ohio

Filed Sept. 10, 1973, Ser. No. 395,723
Int. Cl. B02c *13/286*
U.S. Cl. 241—186.4 **13 Claims**



1. In chipper apparatus for cutting articles such as tree limbs and the like, and including a rotor having means for cutting each article into small pieces, means for supporting said rotor for rotation and for defining an inlet and an outlet, a rotary feed member for positively feeding each article into said inlet for engagement with said cutting means on said rotor, and power operated means for driving said rotor and said feed member, the improvement wherein said means for driving said feed member comprise a clutch having means for sensing the speed of rotation of said rotor, and means responsive to said sensing means for automatically controlling the speed of rotation of said feed member.

3,874,603

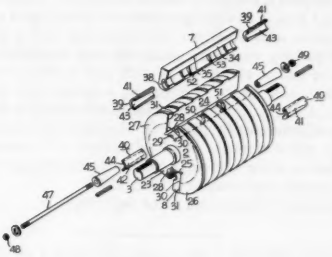
HAMMER LOCKING ARRANGEMENT FOR IMPACT CRUSHER ROTOR

Keith B. Lowe, and William R. Gray, both of Appleton, Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Jan. 16, 1974, Ser. No. 433,882
Int. Cl. B02c *13/06, 13/28*
U.S. Cl. 241—191 **1 Claim**

1. A hammer rotor for an impact crusher having an elongated central body portion with at least a pair of axially extending peripheral slots diametrically opposite each other and extending the entire axial length of the rotor, and first and second hammer means each comprising a hammer bar arranged in one of said slots with a portion of a leading hammer face within said slot and a portion thereof extending outwardly of said slot, characterized by:

a. portion of the leading hammer face within the slot and a facing wall of the slot cooperating to define therebetween a generally cylindrical cavity parallel to an axis about which the rotor rotates;
b. a pair of bushing assemblies in said cylindrical cavity with one located at each end of the cavity and with each said bushing assembly comprising a pair of separate semi-cylindrical bushing halves each having a convex semi-cylindrical outer surface, with the convex surface of one semi-cylindrical bushing half engaging the hammer defined portion of the cylindrical cavity and the convex surface of the other semi-cylindrical bushing half of such a pair engaging the slot wall defined portion of the cylindrical cavity, and said pair of bushing halves cooperating



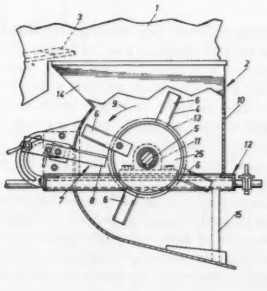
to define therebetween an internal conical shaped cavity with an apex end pointed inwardly of the adjacent end of the rotor;
c. A frusto-conical plug within each pair of said bushing halves and arranged with its apex end also pointed inwardly of the adjacent end of the rotor, and movable inwardly of the adjacent end of the rotor; and
d. a threaded rod projects through both plugs for engaging means operative to hold the plugs in a position applying uniform locking forces at both ends of the hammer.

3,874,604

APPARATUSES FOR DISINTEGRATION OF STRAW AND SIMILAR MATERIAL

Sven D. Gronberg, Kvanum, and Henry Alf Bertil Gronberg, Falkoping, both of Sweden, assignors to Gronbergs Gjuteri Och Kvarnfabrik, Rekordverken AB Ottum, Kvanum, Sweden

Filed Nov. 8, 1973, Ser. No. 413,934
Claims priority, application Sweden, Nov. 16, 1972, 14881/72
Int. Cl. B02c *18/18*
U.S. Cl. 241—243 **5 Claims**



1. Apparatus for disintegrating straw or like material comprising in combination:

a casing having an upper opening for receiving material to be disintegrated and a lower opening for discharging disintegrated material;

a row of laterally spaced knives mounted in said casing;

a rotor assembly journalled in spaced parallelism to said row of knives within said casing, said rotor assembly comprising a rotor shaft, a plurality of discs each having a hub portion and a peripheral portion, the hub portions being hollow and slidably engaged on said rotor shaft and tightening means on at least one end of said rotor shaft for tensioning the rotor shaft and compressing said hub portions to integrate said rotor shaft and discs as a single rotatable unit in which said discs are aligned opposite individual knives of said row of knives, at least one pair of rotor knives disposed in straddling relation to the peripheral portion of each disc so as to extend therefrom and pass in straddling relation to that knife of said row of knives with which the corresponding disc is aligned and mounting means for rotatably and detachably securing one end of each knife of each pair to the corresponding disc, and means interlocking adjacent hub portions of said discs so that the pairs of rotor knives thereof are circumferentially staggered whereby to provide clearance to allow removal and replacement of individual rotor knives while said rotor shaft and discs remain integrated as said single rotatable unit; and

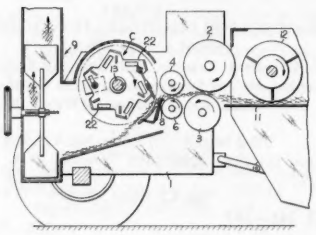
means for rotating said rotor assembly.

3,874,605

CHOPPING CYLINDER FOR FORAGE HARVESTERS OR THE LIKE

Philip F. Fleming, West Bend, Wis., assignor to Gehl Company, West Bend, Wis.

Filed Apr. 3, 1974, Ser. No. 457,588
Int. Cl. B02c *23/00, 18/06*
U.S. Cl. 241—292 **2 Claims**



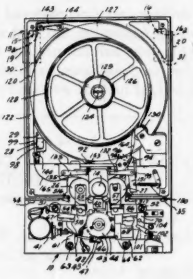
1. A chopping cylinder for a forage harvester or the like comprising a central shaft, a pair of heads mounted transversely at spaced locations on said shaft, said heads each including a pair of spaced apart parallel plates having aligned peripheral seating surfaces, a single knife only detachably secured on said seating surfaces and in a generally longitudinally arranged position, means for detachably securing said knife to said heads and including a bolt and nut insert, slots in said head plates for the reception of said nut inserts, and counter-balance weights removably mounted between the said pairs of plates of said heads and radially within the periphery of said heads so as to form no obstruction to material being chopped, said counter-balance weights being located diametrically opposite to said knife mounted on said heads, and filler pieces insertable in those slots which are located at a diametrically opposite location from said knife, and removable bolt means extending through said plates, said counter-balance weights, and said filler pieces, whereby said counter-balance weights are rigidly and accurately located within the plates of said heads.

3,874,606

VIDEO TRANSDUCER SYSTEM AND CARTRIDGE THEREFOR

Marvin Camras, Glencoe, and Stanley A. Galus, Chicago, both of Ill., assignors to IIT Research Institute, Chicago, Ill.

Filed Aug. 21, 1972, Ser. No. 282,142
Int. Cl. B65h *17/48*
U.S. Cl. 242—55.19 A **2 Claims**



1. In a cartridge transducing system, wherein a cartridge has a pair of pivotal guide arms for guiding a tape record medium of the cartridge along a loading tape path at an open end of the cartridge, and a cartridge support has a capstan drive assembly for reception at one side of the path and a head and capstan pressure rollers for reception at the other side of the path as the cartridge is moved downwardly to an operating position,

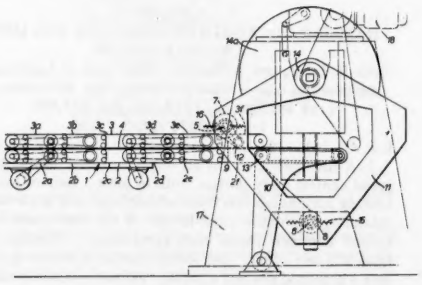
the improvement comprising a cam actuator coupled with said pivotal guide arms, and including cooperating parts on the support and cartridge arranged so that as the cartridge is moved into operating position the cam actuator is actuated to swing the pivotal guide arms to an inactive position clear of the transducing path of the tape record medium.

3,874,607

WINDING OF SHEETS

Peter Hornig, Berlin, Germany, assignor to C.L.P. Fleck Shoe GmbH, Berlin, Germany

Filed Nov. 19, 1973, Ser. No. 417,231
Claims priority, application Germany, Nov. 27, 1972, 2258095
Int. Cl. B65h *17/02*
U.S. Cl. 242—67.1 R **5 Claims**



1. In apparatus for winding sheets into a roll,

bearing plate means,

roll means journalled in the bearing plate means,

means operative to feed sheets to be wound on the roll means,

first spool means carried by the bearing plate means,

first filamentary means wound on the first spool means and extending between the first spool means and the roll means above sheets fed by said feed means such that the filamentary means are laid between the turns of the roll during winding, said first filamentary means comprising, parallel filamentary members,

second spool means carried by the bearing plate means,

second filamentary means wound on the second spool means and extending between the second spool means and the roll means below sheets fed by said feed means, said second filamentary means comprising,

parallel filamentary members, and

a frame, said frame releasably mounting the bearing plate means for movement in an upwards direction.

3,874,608

TAPE MEASURE CASING

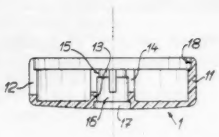
Michel Quenot, Besancon, France, assignor to Stanley-Mabo, Besancon, France

Filed Nov. 19, 1973, Ser. No. 417,469

Claims priority, application France, Nov. 27, 1972, 72.42086

Int. Cl. B65h *75/16*

U.S. Cl. 242—84.8 **8 Claims**



1. A tape measure casing comprising a shell formed by first and second members defining first and second lateral walls of the casing, one of the first and second members being integral with a tape drum and being rotatably mounted relative to the other of the first and second members, the first member having a central hub integral therewith and means defining a cylindrical first central through bore in said hub, said bore opening into an enlarged recess in said first lateral wall, the second member having a central cylindrical pivot integral therewith, said pivot being rotatably received in said first bore of said hub and having an end thereof disposed in the vicinity of said enlarged recess of the first lateral wall, means defining a non-cylindrical second central bore in said end of the pivot, means defining at least one hooking recess in said second bore, and a clipping button for holding said first and second members together, said button including a head rotatably received in said enlarged recess in said one wall, a non-cylindrical shank keyed in said second bore, and at least one elastically deformable projection engaged in said at least one hooking recess in said second bore.

3,874,609

BALE UNROLLER

Irving R. Larson, 524 Illinois St., Salem, Oreg. 97301

Filed Nov. 8, 1973, Ser. No. 413,910

Int. Cl. B65h *75/40*; **B60p** *1/38*

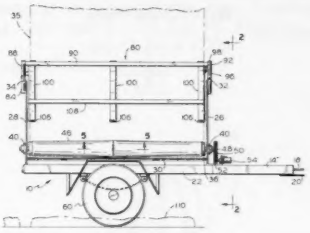
U.S. Cl. 242—86.5 R **10 Claims**

1. Apparatus for distributing a rolled, substantially cylindrical hay bale comprising:

a frame for receiving said bale so that said bale is in an axis horizontal position, said frame being adapted for transport over the ground,

and an under member supported by said frame for sustaining the weight of said bale, said under member comprising a conveyor belt supporting the side of said bale and having a width approximately as long as the length of said bale, said conveyor belt having a concave cross section where said bale is supported,

said frame locating an exit portion of said conveyor belt near a side of said frame for depositing portions of said



bale on a ground surface or in a container as said conveyor belt rotates said bale to unwind said bale,

wherein said frame includes a retaining portion disposed above the exit portion of said conveyor belt in spaced relation thereto for permitting the exit of said bale between said retaining portion and said belt as said bale unwinds, said retaining portion preventing translation of said bale as a whole along said conveyor.

3,874,610

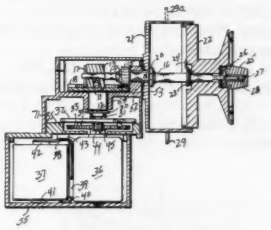
POWERED FISHING REEL

Eric C. Wahlberg, 32 Eighth St., Stamford, Conn. 06905

Continuation-in-part of Ser. No. 36,269, May 11, 1970, abandoned. This application Aug. 7, 1972, Ser. No. 278,619

Int. Cl. A01k *89/00, 89/02*

U.S. Cl. 242—84.1 A **9 Claims**



1. An apparatus used in fishing and removably attachable to any standard fishing pole having a fishing line comprising: a self-contained motor and a reel driven thereby; an energy source for said motor for operating said reel; said reel including a spool and flyer; a tension mechanism having a preselected tension setting and being operatively connected to said reel; said flyer being adapted to rotate under normal conditions but to move in a direction along its longitudinal axis when the load on the fishing line exceeds said tension setting; a first means connecting said energy source to said motor; a second means connecting said motor to said reel; and a mechanism mounted on said apparatus for sensing said axial movement of said flyer as a result of the load on said fishing line in order to connect or disconnect said energy source to the motor.

3,874,611

METHOD AND APPARATUS FOR DRAWING OFF WIRE OR OTHER FILAMENTARY MATERIAL FROM AN ANNULAR CONTAINER

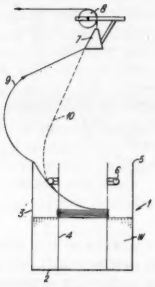
James Francis Slasor, Guildford, and Bruce Henry Keen, Hounslow, both of England, assignors to British Insulated Callender's Cables Limited, London, England

Filed Jan. 18, 1973, Ser. No. 324,854

Claims priority, application United Kingdom, Jan. 20, 1972, 2835/72

Int. Cl. B65h *49/00*

U.S. Cl. 242—129 19 Claims



1. A pak comprising a base and, upstanding from the base, a peripheral boundary wall and an inner cylindrical wall which define between them an annular space for storing wire in superposed layers, wherein the boundary wall has an endless rim and the inner cylindrical wall has extending radially outwardly from the wall at a position on said wall a substantial distance below the level of the rim of the boundary wall a circumferential surface which is fixed with respect to the rim of the boundary wall and which has a diameter substantially greater than the diameter of the inner wall but less than the internal diameter of the boundary wall.

3,874,612

YARN TENSIONING DEVICE

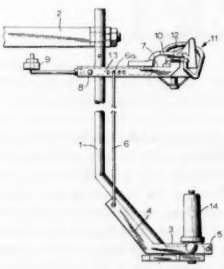
Joseph John Hurley, Paisley, Scotland, assignor to J & P Coats Limited, Glasgow, Scotland

Filed July 31, 1973, Ser. No. 384,308

Claims priority, application United Kingdom, Aug. 5, 1972, 36650/72

Int. Cl. B65h *59/00, 59/22*

U.S. Cl. 242—149 3 Claims



1. An automatic yarn tensioning device incorporating a yarn tensioning means operative by application of a biasing force to it so as to apply a retarding force to a yarn passing therethrough, biasing means arranged for applying a predetermined biasing force to said yarn tensioning means, said yarn tensioning device including a first lever, a fixed pivot on which said first lever is mounted, said first lever being operatively connected to said biasing means and said tensioning means so that the force exerted by the biasing means tends to swing said first lever so as to apply a constant biasing force to the tensioning device, a second lever, a fixed pivot on which said second lever is mounted, a link connecting said first lever to said second lever, a yarn package carrier mounted on said second lever so that at least part of the total weight of said yarn package carrier and a yarn package carried thereon is available as an unbalanced force tending to swing said second lever so as to transmit the variable unbalanced force available from the yarn package carrier to said first lever as a variable control force opposing the biasing force generated by the biasing means.

3,874,613

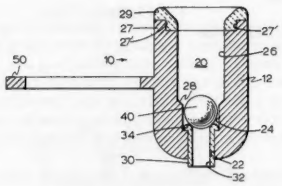
YARN TENSIONING DEVICE

Otto Zollinger, 120 Pine Acres Dr., Spartanburg, S.C. 29302

Continuation-in-part of Ser. No. 297,995, Oct. 16, 1973, Pat. No. 3,753,535. This application July 23, 1973, Ser. No. 381,979

Int. Cl. B65h *59/22*

U.S. Cl. 242—152.1 33 Claims



1. A tension device comprising:

a. a housing, said housing having a yarn passageway extending therethrough, said yarn passageway having a large diameter section and a small diameter section, an outer end of said large diameter section of passageway having rounded abrasion resistant corners;

b. an uninterrupted seat provided along said passageway at the junction of said large and small diameter sections and having an opening therethrough, said seat receiving a spherical element thereat and holding said spherical element out of contact with walls of said large diameter section of said passageway when no yarn is passing through said opening, said seat having surfaces around said opening with a radius of curvature opposite the curvature of said spherical element; and

c. a spherical element receivable in said large diameter section of said passageway, said spherical element having a diameter less than the length of said large diameter section and said large diameter section having a diameter adjacent said seat to prohibit substantial lateral movement of said spherical element received thereat.

3,874,614

TAPE DRIVE

Dean W. Flygstad, St. Paul, Minn., assignor to Telex Communications, Inc., Minneapolis, Minn.

Filed June 11, 1973, Ser. No. 368,649

Int. Cl. G03b *1/04*

U.S. Cl. 242—209 10 Claims

1. In apparatus of the class above described, the combination comprising;

a base;

a capstan rotatably journaled on said base;

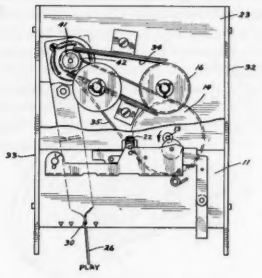
a take-up spindle rotatably journaled on said base;

a motor having a shaft and a pair of drive pulleys thereon;

mounting means for adjustably mounting said motor on

said base, the axes of said motor, capstan and said take-up spindle being in parallelism;

a resilient drive belt intermediate one of the pulleys on said motor and said capstan;



a pressure responsive pulley on said take-up spindle; and

a non-extendible drive belt intermediate the other pulley on said motor and the pressure responsive pulley on said take-up spindle.

3,874,615

FISHING REELS

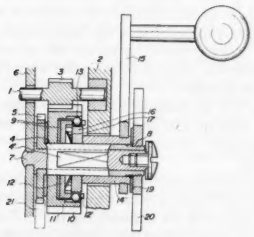
Noriyasu Fukushima, Saitama, Japan, assignor to Daiwa Seiko Incorporated, Tokyo, Japan

Filed July 3, 1973, Ser. No. 376,238

Claims priority, application Japan, July 27, 1972, 47-75616; Oct. 13, 1972, 47-11906

Int. Cl. A01k *89/00*

U.S. Cl. 242—219 **8 Claims**



1. A fishing reel, comprising:

a fixed shaft;

a hollow rotatable shaft disposed about said fixed shaft;

self-locking means fixedly connected to said rotatable shaft for allowing rotation of said shaft in a first direction and preventing rotation in the second direction;

a spool shaft;

a gear wheel secured to said spool shaft;

a driving gear meshed with said gear wheel;

locking means for engaging and disengaging said driving gear;

retaining means fixedly connected to said rotatable shaft for controlling the circumferential movement of said locking means;

handle means; and

operating means connected to said handle means for causing said locking means to engage said driving gear and thus connect said driving gear with said handle means when in one position with respect to said retaining means which position is reached by turning said operating means in said first direction and for causing said locking means to disengage said driving gear and thus disconnect said driving gear from said handle means when in another position with respect to said retaining means which other position is reached by turning said operating means in said second direction.

3,874,616

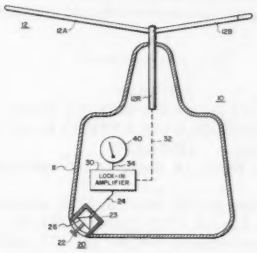
ELECTROSTATIC FIELD MEASURING DEVICE

Rudolf G. Buser, Wall, and Helmuth M. Kaunzinger, Neptune, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 2, 1973, Ser. No. 376,028

Int. Cl. B64d *47/00*

U.S. Cl. 244—17.11 **2 Claims**



1. An electrostatic field measuring device for a helicopter having a plurality of rotating blades projecting outwardly from a point above the fuselage of said helicopter comprising:

a sensor electrode projecting downwardly and outwardly from said helicopter at a location on the lower surface of said fuselage substantially removed from the central axis of said helicopter;

amplifying means including a lock-in amplifier having an input connected to said sensor electrode, for amplifying at least any alternating current component of the output of said sensor electrode;

means associated with said rotor blades for gating said lock-in amplifier synchronously with said rotor blades to sample any signal on said sensor electrode repetitively to provide an alternating output at a reduced noise level; and

indicating means connected to the output of said amplifying means for indicating the amplified level of any alternating current component from said sensor electrode, which is proportional to the electrostatic field adjacent to said device.

3,874,617

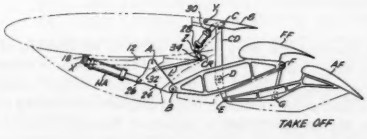
STOL FLAPS

Robert E. Johnson, Alamitos, Calif., assignor to McDonnell Douglas Corporation, Santa Monica, Calif.

Filed July 17, 1974, Ser. No. 489,394

Int. Cl. B64c *3/50*

U.S. Cl. 244—42 DA **6 Claims**



1. A flap system for an aircraft wing comprising:

an aircraft wing having a trailing edge,

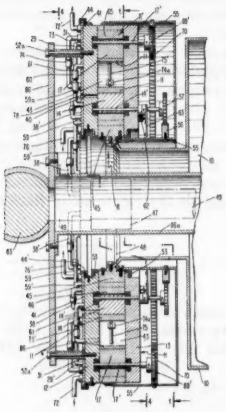
a spoiler pivotally hinged near said trailing edge,
a main flap drive crank pivotally mounted under said wing and movable by an actuator connected thereto,
means interconnecting said spoiler with said crank for actuation thereby,
a first swinging link pivotally suspended from said wing,
a fore flap mounted on a fore link, said fore link being pivotally connected to said crank,
said swinging link and said fore link being pivotally connected whereby said fore flap may be moved by said actuator in a downwardly and rearwardly direction,
an aft flap mounted on an aft link,
an aft swinging link pivotally connected between said fore link and said aft link,
said first swinging link extending beyond its pivotal connection with said fore link and being pivotally connected to said aft link whereby said aft flap may be moved by said first swinging link in a downwardly and rearwardly direction.

3,874,618

COMBINATION OF A ROTARY PRIME MOVER-COMPRESSOR WITH A VEHICLE, SUCH AS AN AIRCRAFT

Kenneth Clayton Bates, 28 Scenic Dr., Poughkeepsie, N.Y. 12603

Division of Ser. Nos. 40,720, May 26, 1970, abandoned, and Ser. No. 65,233, Aug. 19, 1970, Pat. No. 3,781,146, said Ser. No. 40,720, Continuation of Ser. No. 658,175, said Ser. No. 65,233, Continuation-in-part of Ser. No. 40,720. This application Apr. 24, 1972, Ser. No. 246,876
Int. Cl. B64c *25/50*
U.S. Cl. 244—50 **19 Claims**



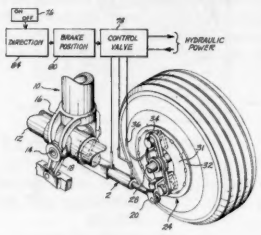
1. The combination on a vehicle such as an aircraft, of a stationary axle secured to the chassis of the vehicle, a vehicle supporting wheel mounted on the axle for rotation relative thereto, a fluid pressure driven rotary engine surrounding said axle, said engine comprising a stationary housing secured to said chassis and a power rotor in the housing integrally connected to said wheel to rotate the latter relative to said axle, and means for selectively controlling the emission of fluids from said housing to resist rotation of said rotor by said wheel.

3,874,619

RECIPROCATING POWERED WHEEL DRIVE

Richard Clement Collins, Bellevue; John Donald Mayer, Seattle, and Bernard Britton Thompson, Bainbridge Island, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed May 3, 1974, Ser. No. 466,611
Int. Cl. B64c *25/50*
U.S. Cl. 244—50 **23 Claims**



6. In an aircraft having a hydraulic power system for supplying hydraulic pressure fluid, landing gear means including wheels rotatively mounted on the landing gear means, rotative hydraulically powered brake means including brake actuator means connected in the hydraulic system to selectively actuate the brake means to exert braking effort on the aircraft wheels and de-actuate the brake means to free the aircraft wheels of such braking effort, combination driving and braking apparatus comprising:
hydraulically powered reciprocative brake positioning means connected in the hydraulic system for positioning and moving the brake means rotationally;
control means connected in the hydraulic system for selectively operating the brake actuator means to actuate the brake means while operating the brake positioning means for movement in one direction to rotate the wheel means and alternately to de-actuate the brake means while operating the brake positioning means for movement in the reverse direction without rotating the wheel means, so as to drive the aircraft;
valve means for by-passing the control means to permit actuation and de-actuation of the brake means by the brake actuator means independently of the control means; and
valve means for selectively isolating the brake positioning means and the control means from the aircraft hydraulic power system and for maintaining the brake positioning means stationary while permitting actuation and de-actuation of the brake means by the brake actuator means, so as to brake the aircraft.

3,874,620

REVERSING APPARATUS FOR A JET ENGINE

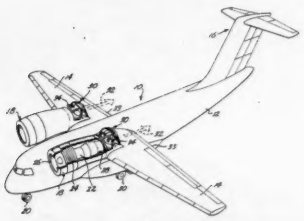
Charles Kahler, Kirkland, and Lucas James Kimes, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Mar. 9, 1973, Ser. No. 339,725
Int. Cl. B64c *15/04*
U.S. Cl. 244—110 B **7 Claims**

1. An improvement is thrust reversing apparatus for an aircraft including a main wing having an upper airfoil surface and a jet propulsion engine which develops thrust by discharge of an exhaust stream in a rearward direction from said engine, said engine having an exhaust nozzle for receiving said exhaust stream from said engine, said exhaust nozzle including a generally rounded and annularly shaped forward portion fixed to said engine, a lower wall fixed to and extending rearwardly from said forward portion and a pair of fixed sidewalls fixed to and extending rearwardly from said forward portion, said lower wall merging into said upper airfoil surface, said pair of

sidewalls being spaced transversely relative to the discharge direction of said exhaust stream and being fixed to and extending upwardly from said lower wall, said improvement comprising:

a. movable door means having a channel-like configuration, said door means including a pair of sidewalls, a top wall, and a forward portion, said sidewalls being spaced transversely relative to the discharge direction of said exhaust stream and being spaced by a distance substantially equal to the spacing of the fixed sidewalls of said exhaust nozzle, said sidewalls having upper portions, said top wall extending between and interconnected with the upper portions of said sidewalls, said sidewalls and the top wall of said movable door means having forward edges and terminating in rearward edges,



b. first means mounting said movable door means to the fixed sidewalls of said exhaust nozzle for movement between

1. a first position wherein the sidewalls of said movable door means extend upwardly from a location above respective ones of the fixed sidewalls of said nozzle and said top wall is spaced above said lower wall and wherein the top wall and the sidewalls of said movable door means extend rearwardly from the forward portion of said exhaust nozzle such that the sidewalls and the top wall of said movable door means cooperate with the lower wall and the fixed sidewalls of said exhaust nozzle to form a portion of said exhaust nozzle for directing said exhaust stream rearwardly and across the upper airfoil surface of said wing, and

2. a second position wherein said rearward edges of said movable door means abut said lower wall, wherein the sidewalls and the top wall of said movable door means extend upwardly from said lower wall to block the rearward discharge of said exhaust stream, and wherein said forward edges are located rearwardly and upwardly from the forward portion of said exhaust nozzle such that said forward edges, said fixed sidewalls and the forward portion of said exhaust nozzle form a reversing nozzle opening for directing said exhaust stream upwardly and forwardly relative to said engine,

c. lip door means having an exhaust deflecting surface,

d. second means mounting said lip door means on the forward portion of said movable door means for movement between

1. a nested position wherein said lip door means is nested between the sidewalls of said movable door means and below the top wall of said movable door means at a location rearward of and adjacent to the forward edges of said movable door means, and

2. a deflecting position wherein said exhaust deflecting surface is located such that, when said movable door means is in said second position, said exhaust stream will impinge upon said deflecting surface and will be deflected forwardly relative to the direction said exhaust stream is directed by said movable door means, and

e. actuating means operatively coupled to said lip door means for moving said lip door means between said nested and said deflecting positions as said movable door means is moved respectively between said first and second positions.

3,874,621

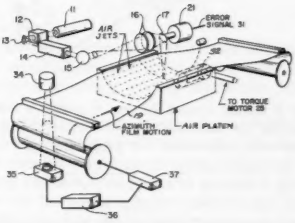
RECORDING SYSTEM USING GAS LASER

Lloyd R. Blair, Phoenix; Robert E. Meyer, Glendale, both of Ariz.; Dennis H. Rose, San Jose, Calif.; James E. Smith, Boulder, Colo., and Jack E. Steinfeldt, Buckeye, Ariz., assignors to The United States of America as represented by the Secretary of the United States Army, Washington, D.C.

Filed Feb. 9, 1970, Ser. No. 14,821

Int. Cl. G01d 9/00

U.S. Cl. 346—108 **5 Claims**



1. A wide band recording system comprising:

a continuous wave gas laser for producing a laser beam;

a crystal light modulator through which said laser beam is focused;

a scanning mirror onto which the modulated laser beam impinges;

a first synchronization means to control the scanning mirror rotational rate;

a film onto which said modulated laser beam is focused by said scanning mirror;

a second synchronization means to control the rate at which the film is moved past said scanning mirror, said second synchronization means consisting of a 20 KC local oscillator having a first and a second output, a signal generator for receiving an optically generated signal off the shaft of a film motor and producing an electrical output of the same frequency as said optically generated signal, a first mixer circuit having two inputs and an output wherein the electrical output from said signal generator and the first output from said 20 KC local oscillator are applied separately to each of said two inputs, a second mixer having a first and a second input and an output, a reference oscillator having an output applied to the first input of said second mixer and the second output from said 20 KC local oscillator applied to the second input of said second mixer, and a counter having a first and a second input and an output wherein the output from said first mixer is applied to the first input of said counter as a count down and the output of said second mixer is applied to the second input of said counter as a count up wherein the output from said counter controls the speed of said film motor;

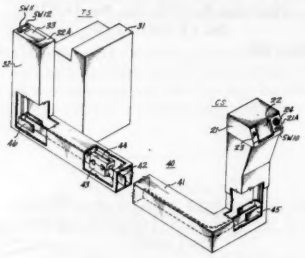
an air film platen to shape said film into cylindrical form as it passes the exposure point; and

an optically controlled monitoring means to control the film loop as it comes off the film roll.

3,874,622
REMOTE TELLER

Galen A. Biery, Jr., Bellingham; Dan E. Rothenbuhler, Sedro Woolley, and Howard E. Rothenbuhler, Acme, all of Wash., assignors to Rotherbuhler Engineering Inc., Sedro Woolley, Wash.

Filed Apr. 19, 1973, Ser. No. 352,618
Int. Cl. B61l *3/10*
U.S. Cl. 246—182 B **7 Claims**

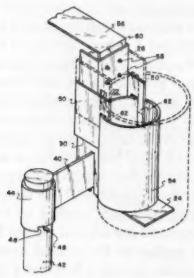


1. In a transit system having a track, a self-powered car translatable on said track, said car including drive means engaged with said track for propelling said car along said track, the improvement comprising a velocity control means including a plurality of actuators spaced in a group along said track at a point where velocity control of said car is desired, at least one sensor disposed on said car and operative to provide an output pulse when said sensor comes into proximity with each one of said plurality of actuators, and braking means responsive to each said output pulse for braking said drive means for a predetermined period of time following each said output pulse.

3,874,623
COOKING APPLIANCE

Ronald D. Moulton, 4582 Russell St., Salt Lake City, Utah 84117

Filed June 18, 1973, Ser. No. 371,001
Int. Cl. A47g *29/14*
U.S. Cl. 248—121 **9 Claims**



1. A cooking appliance for securing a container having any one of a plurality of sizes such that the container is suspendable over a heat source, the appliance comprising:

a stake;

a rigid holding bracket removably attached to the stake and comprising an outwardly projecting flange upon which at least a portion of the peripheral edge of the container rests;

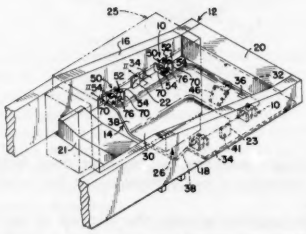
a retaining sleeve slidably engaging the rigid holding bracket and comprising depending tabs for securing the container to the holding bracket; and

handle means removably attachable to the holding bracket.

3,874,624
CONNECTOR ASSEMBLY

Albert Gianessi, East Peoria, Ill., assignor to Caterpiller Tractor Co., Peoria, Ill.

Filed Nov. 19, 1973, Ser. No. 416,731
Int. Cl. B60k *5/00;* **F16m** *5/00*
U.S. Cl. 248—200 **6 Claims**



1. An improved connector assembly, for removably securing a member having a bolt receiving opening therethrough to a frame, which frame has a wall disposed in radially spaced, substantially parallel relation to such bolt receiving opening, comprising;

support bracket means secured to such wall of said frame and providing a pair of laterally spaced bracket plates disposed on opposite sides of said opening and having a pair of aligned, semicircular bearing recesses disposed axially normal to said opening and opening away therefrom;

a connector nut having a threaded bore therethrough and a pair of oppositely extending stub shafts disposed along a mounting axis normal to said bore, said stub shafts being adapted for cradling receipt within said bearing recesses of said bracket plates so as to loosely mount said connector nut in spaced relation from said member and said wall of said frame to allow pivotal movement about and limited sliding movement along said mounting axis between said bracket plates to permit the precise alignment of said threaded bore of said connector nut with said bolt receiving opening of said member;

flange means carried on said connector nut; and

pin means detachably mountable to said bracket means for cooperative engagement with said flange means for selectively retaining said stub shafts of said connector nuts in torque transmitting engagement within their respective bearing recesses to constrain rotary movement of said connector nut about its threaded bore when such pin means are mounted to said bracket means, and for permitting selective removal of said connector nut for replacement purposes when said pin means are dismounted therefrom.

3,874,625

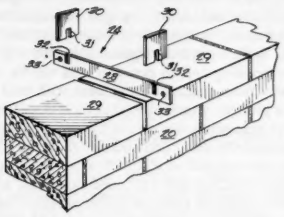
SUPPORT BRACE FOR WALLS AND THE LIKE

Robert N. Hansen, 21W262 Crescent Dr., Glen Ellyn, Ill. 60137; George T. Hempel, One Oak Brook Club Dr., Oak Brook, Ill. 60521, and Raymond Noesges, 27W377 Oakwood, Winfield, Ill. 60190

Continuation-in-part of Ser. No. 259,011, June 2, 1972, abandoned. This application Feb. 22, 1974, Ser. No. 444,812

Int. Cl. E04g *25/04;* **F16m** *11/28*

U.S. Cl. 248—354 S **6 Claims**



1. An adjustable support brace for walls and the like, comprising foot anchor means for providing a foundation for the brace on an underlying surface, wall anchor means for attaching the brace to the supported wall including an anchor member adapted to extend through the wall and at least one face plate member for attachment to the anchor member in a position closely adjacent the wall face, thereby securing the anchor member in its position, the support brace further comprising stiff arm means attachable to the wall anchor means, stiff arm adjustment means for adjusting the length of the stiff arm means, first, second and third axially aligned struts comprising buttress brace means attachable to the stiff arm means, to the wall anchor means, and to the foot plate means, said first and second struts being telescopically interconnected, and buttress brace adjustment means for adjusting the length of the buttress brace means to place the buttress brace means in wall-supporting compression when the buttress brace means is attached to the stiff arm means, to the wall anchor means, and to the foot plate means, the buttress brace adjustment means including gross adjustment means rigidly positioning the first and second telescopically interconnected struts in any one of a finite plurality of axially spaced apart positions, and fine adjustment means positioning the second and third struts in any one of an infinite plurality of axially ranged positions.

3,874,626

SEAT, PARTICULARLY FOR AUTOMOTIVE VEHICLES

Karl-Ulrich Gross; Jurgen Sroka, both of Hilden, and Kurt Biesen, Solingen, all of Germany, assignors to Bremshey Aktiengesellschaft, Solingen-Ohligs, Germany

Filed July 9, 1973, Ser. No. 377,725

Claims priority, application Germany, July 8, 1972, 2233674; June 1, 1973, 2327850

Int. Cl. F16m *13/00*

U.S. Cl. 248—399 **12 Claims**

1. A seat, particularly for automotive vehicles, comprising a seat-surface support, a seat base including links,

said seat-surface support being spring-biased in vertical direction and guided by said links of said seat base,

a force-storage compression spring disposed below said seat-surface support,

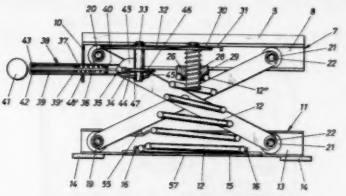
an abutment means associated with one end of said force-storage compression spring for adjustment of the initial spring tension by displacement of the height of said abutment means,

a threaded spindle supporting said abutment means,

a switch ratchet mechanism actuating said threaded spindle, and

the latter extending into the inside of said compression spring, and

said threaded spindle is provided with a gear, the latter being disposed at the bottom of said seat-surface support,



a transmission gear including a shaft, said threaded spindle gear engages with said transmission gear and said shaft includes a switch ratchet mechanism having a ratchet wheel,

the latter includes an operating swing lever, which extends beyond the front edge of said seat surface support.

3,874,627

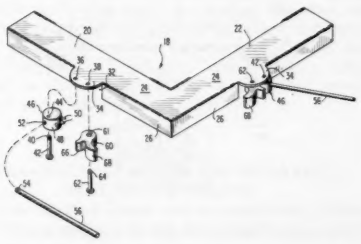
CONCRETE MOLD FORM WALE CONNECTOR

Ronald R. Vaught, Jourdanton, Tex.

Filed May 31, 1974, Ser. No. 475,142

Int. Cl. F16b *7/04*

U.S. Cl. 249—219 W **8 Claims**



1. A lockable whale connector for connecting and aligning the intersecting projecting beam ends of concrete molding form framework sections or the like, said lockable whale connector comprising:

a sheet metal body of L-shaped configuration having intersecting integral arms forming beam receiving channels of rectangular cross section,

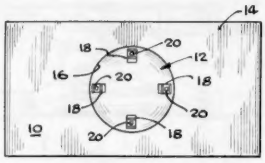
an eccentric operatively mounted to the side of each arm for frictional peripheral contact with the side of the beam embraced by said arm;

whereby, rotation of each eccentric fictionally drives the beams axially within respective arms towards each other to effect proper alignment and positioning of the beams with respect to each other, while simultaneously pressing said beams against the sidewall of said arms opposite that carrying said eccentric.

3,874,628
REPAIRED BASE PLATE FOR INGOT MOLD

Robert C. Jarron, 484 Wicklow Rd., Burlington, Ontario, and Peter L. Petersen, 48 Cloverhill Rd., Hamilton, Ontario, both of Canada

Division of Ser. No. 356,697, May 18, 1973, which is a continuation-in-part of Ser. No. 143,345, May 14, 1971, abandoned. This application Mar. 4, 1974, Ser. No. 447,601
Int. Cl. B22d *35/04*
U.S. Cl. 249—204 **5 Claims**

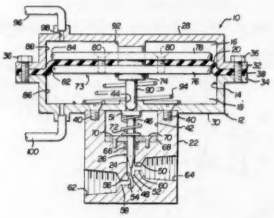


1. A repaired base member for a two part ingot mold comprising a cast iron base for a separate and detachable vertically positioned hollow mold, said base having formed within its top surface a cavity, said cavity having attached to its surface by mechanical means at least two irregularly-shaped metal anchor bars and said cavity being completely filled with a cured thermally resistant refractory composition which contains at least 40 percent by weight of alumina.

3,874,629
FLUID OPERATED NEEDLE VALVE

John G. Fontaine, Fort Lauderdale, Fla., assignor to Fail Safe Brake Corporation, Fort Lauderdale, Fla.

Continuation-in-part of Ser. No. 211,481, Nov. 23, 1971, abandoned. This application Aug. 6, 1973, Ser. No. 385,972
Int. Cl. F16k *31/365*
U.S. Cl. 251—61.4 **1 Claim**

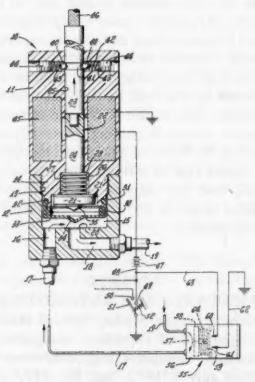


1. In a fluid operated needle valve comprising:
a valve housing having an inlet and an outlet and an annular valve seat between said inlet and said outlet, a conical needle valve element reciprocable in said housing toward and away from sealing engagement with said valve seat to control fluid flow between said inlet and said outlet;
a separate actuator housing releasably attached to said valve housing on the opposite side of said needle valve element from said valve seat, said actuator housing providing a fluid chamber, a fluid-displaceable actuator reciprocable in said fluid chamber between a retracted position away from said valve housing and an extended position toward said valve housing, fluid inlet and outlet means communicating with said fluid chamber for effecting movement of the actuator, and spring means in said actuator housing biasing said actuator to said retracted position;
the improvement wherein
said valve housing has a cavity therein which is open at its outer end at the side of the valve housing toward the actuator housing and is located on the opposite side of the needle valve element from said valve seat;
and said actuator housing has an end wall extending across said fluid chamber therein and extending flat across the open outer end of said cavity in the valve housing, said end wall having an opening therein leading into said cavity in the valve housing and aligned with said needle valve element and said valve seat;
and further comprising:
a valve stem connected to said needle valve element and extending therefrom into said cavity in the valve housing and terminating thereat in an enlarged head, spring means in said cavity engaged between the inner end of said cavity in the valve housing and said head to bias the latter outwardly against said end wall of the actuator housing and to position said needle valve element away from sealing engagement with said valve seat;
and a plunger attached to said fluid displaceable actuator and extending therefrom toward said end wall of the actuator housing and slidably received in said opening in said end wall in all positions of the actuator between said retracted and extended positions, said plunger in said retracted position of the actuator being retracted thereby to a position permitting said enlarged head on the valve stem to directly engage said end wall of the actuator housing around said opening in the latter, said plunger being engageable with said head on the valve stem to move the needle valve element toward the valve seat upon displacement of the actuator from its retracted position toward its extended position.

3,874,630
SAFETY MANUAL RELEASE SOLENOID VALVE

Richard T. Novey, 10090 Bromont St., Sun Valley, Calif.

Filed Jan. 26, 1973, Ser. No. 326,884
Int. Cl. F16k *31/00*
U.S. Cl. 251—68 **4 Claims**



1. A semiautomatic valve device for a liquid line comprising a housing having a valve chamber therein, an inlet port and an outlet port in communication between the valve chamber and the exterior, a valve seat located between the chamber and the outlet port, a valve element reciprocatably mounted in said chamber for movement between open and closed positions, a stem on said valve element slidably mounted in said housing and accessible from the exterior, a solenoid mounted in said housing having a bore therethrough adapted to reciprocatably receive said valve stem acting as a plunger, and a temporary detent in said housing in releasable engagement with the valve stem when the valve element is in open position, and an electric circuit having a primary switch therein operable when said primary switch is closed to energize said solenoid and effect

release of said temporary detent and closing of said valve device, a seal member of flexible material in the chamber separating said valve element from said valve seat, said seal comprising a transverse portion located clear of both said valve seat and said valve element in open position of the valve element and being in engagement simultaneously with said valve seat and said valve element in closed position of the valve, said seal having a resilient side wall structure adapted to elongate and contract with movement of said valve element, said housing comprising a first section in which said solenoid and said valve stem are located and a second section having a releasable engagement with the first section, said second section having a portion of said chamber therein, said seal being anchored in sealing engagement at the perimeter thereof with one only of said sections at the wall of said chamber.

3,874,631

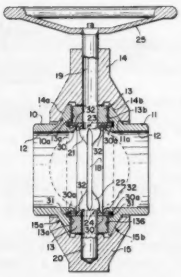
ADJUSTABLE, CORROSION-RESISTANT, BUTTERFLY VALVE

Robert H. Osthues, West Boylston, Mass., assignor to Worcester Controls Corporation, West Boylston, Mass.

Filed Feb. 15, 1974, Ser. No. 443,049

Int. Cl. F16k *1/226*

U.S. Cl. 251—148 **10 Claims**



1. In a butterfly valve of the type comprising a pair of pipe ends disposed in spaced axially aligned relation to one another to define a flow passage therethrough, a valve disc mounted for rotary movement between said pipe ends for opening and closing said passage, said disc being mounted on a shaft journaled at its opposing ends in a pair of body members which are disposed in radially spaced relation to one another about said flow passage, each of said body members including inclined interior surfaces in engagement with complementarily inclined exterior surfaces on said pipe ends to complete said flow passage and to permit relative movement between said body members and pipe ends, a resilient annular seat for said disc, said seat having its outer diameter in engagement with said pair of body members and having its axially opposed faces in engagement with said pair of pipe ends respectively, and adjustment means between said body members for selectively moving said body members toward and away from one another to control the radial compressive forces exerted on said seat while, through the agency of said complementarily inclined interior and exterior surfaces, simultaneously moving said pair of pipe ends toward and away from one another to control the axial compressive forces exerted on said seat, the improvement comprising an annular liner of plastic material separate from said seat and disposed about said flow passage between said pipe ends, the outer diameter of said annular liner being in engagement with the inner diameter of said seat and the inner diameter of said annular liner being in engagement with the outer diameter of said disc, each of said pipe ends including an annular flange extending in an axial direction generally parallel to the inner diameter of said liner, each said flange terminating respectively in a sealing lip directed radially toward said seat and in forcible sealing engagement with the inner diameter of said liner at a position displaced from the axial edges of said liner.

3,874,632

EMERGENCY FIRE ESCAPE

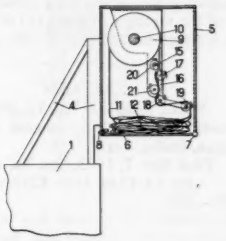
John Joseph Rago, 31 Avenue Charles de Gaulle, Montmorenoy, France

Filed Feb. 22, 1973, Ser. No. 334,945

Claims priority, application France, Oct. 27, 1972, 72.38278

Int. Cl. B66d *5/04;* **A62b** *1/10*

U.S. Cl. 254—159 **11 Claims**



1. Safety device for evacuating a person from a building which device comprises a box having a door in its bottom, a pulley within said box, an endless cord lying on said door and passing over said pulley, means within said box for braking the advance of said cord in at least one direction over said pulley, remotely controlled means for opening said door, and means for manually gripping said cord, said gripping means comprising a pair of jaws pivotally connected to each other, resilient means biassing said jaws apart, and gravity actuated latching means for holding said jaws in a closed position.

7. Safety device for evacuating a person from a building which device comprises a box having a door in its bottom, a pulley within said box, an endless cord lying on said door and passing over said pulley, means within said box for braking the advance of said cord in at least one direction over said pulley, and remotely controlled means for opening said door, said braking means comprising several braking pulleys and a speed detecting pulley over which said cord passes, together with means for stopping or braking the various braking pulleys successively at various speeds of rotation distributed between a minimum and a maximum speed.

3,874,633

SEPARABLE VALVE COCK AND SEPARABLE STRUCTURE THEREFOR

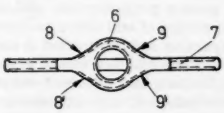
Walter Kreis, and Paul Trosch, both of Schaffhausen, Switzerland, assignors to Georg Fischer AG, Schaffhausen, Switzerland

Filed Aug. 14, 1973, Ser. No. 388,156

Claims priority, application Switzerland, Aug. 24, 1972, 12531/72

Int. Cl. F16k *41/04*

U.S. Cl. 251—214 **9 Claims**



1. In a separable valve cock having two half housings (**1, 3**), a valve member (**4**) movable in the housing and having an operating spindle (**2**) penetrating through the housing at the junction of the housing halves;

grooves (16, 16') formed at mating surfaces (12) of the housing halves, and a unitary sealing gasket (5) fitting in said grooves to seal the halves together and having an apertured neck portion (6) fitting about the spindle, a housing sealing portion (7) sealing the housing halves in the region surrounding the valve member, and a transition portion connecting the neck portion (6) and the housing sealing portion,

the improvement wherein

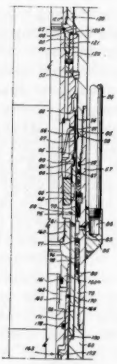
means are provided, including a bulge of material, to apply radial pressure inwardly toward the spindle at the transition zone between the neck portion (6) and the housing sealing portion (7) of the gasket to apply a bias force on the sealing gasket acting in a direction parallel to the plane of the mating surfaces (12) of the housing halves and in a direction (13) towards the spindle.

3,874,634

WELL SAFETY VALVE SYSTEM

Irme I. Gazda, Saginaw, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Nov. 7, 1973, Ser. No. 413,617
Int. Cl. F16k *3/00*; E21b *43/12*
U.S. Cl. 251—319 **5 Claims**



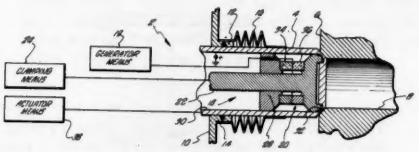
1. A sleeve shifter for moving the valve member of a sliding sleeve valve between open and closed positions comprising: a tubular body mandrel; an outer sleeve secured in concentric spaced relation around said body mandrel, said sleeve having oppositely disposed side slots opening through one end of said sleeve and guide windows between said side slots, said guide windows having a wide first end and a narrow second end; an inner sleeve having one end portion positioned within said outer sleeve between said outer sleeve and said body mandrel, said inner sleeve having outwardly opening side pockets each aligned and connecting with one of said side slots of said outer sleeve, and said inner sleeve having retainer fingers along a second end portion projecting into said side pockets toward said first end portion of said sleeve; an operating key disposed for radial expansion and contraction in each one of said connecting side pockets and slots of said inner and outer sleeves, said keys each having ear portions at one end thereof engaged in said guide windows of said outer sleeve and the other ends of said keys having recesses engageable with said retainer fingers at said second end of said inner sleeve, said keys being movable longitudinally relative to said outer sleeve and said body mandrel with said inner sleeve shifting said ears on said keys from said first wide ends of said guide windows to said second narrow ends of said guide slot for contracting said first ends of said keys radially inwardly to release said keys from a sliding sleeve valve; means between said keys and said body mandrel for biasing said keys radially outwardly; and holding means between said outer and inner sleeves connecting said sleeves together for retaining said inner sleeve at a first position relative to said outer sleeve at which said keys are movable only radially, said holding means being releasable when a force in excess of a predetermined value is applied to said keys toward said second end of said inner sleeve whereby said keys are moved with said inner sleeve away from said first end of said outer sleeve and said ears on said first end of said keys are moved into said narrow portions of said guide windows of said outer sleeve for contracting said keys inwardly along said first end portions of said keys for release of said keys from a valve member of a sliding sleeve valve.

3,874,635

ULTRASONICALLY BONDED VALVE ASSEMBLY

James C. Fletcher, administrator of the National Aeronautics and Space Administration, with respect to an invention by, Richard J. Salvinski, Hacienda Heights, Calif.

Filed Sept. 28, 1973, Ser. No. 401,920
Int. Cl. F16k *31/02*; B23k *21/00*
U.S. Cl. 251—333 **11 Claims**



1. A valve apparatus for providing a repeatable fluid-tight seal capable of controlling corrosive liquid and the like in a spacecraft comprising:

a valve member having a first sealing surface;

a valve seat member having a second sealing surface and a fluid conduit adapted to receive the valve member, one of the sealing surfaces of the valve member and the valve seat member being made from a relatively soft material and the other member being made from a relatively hard material having the characteristics of being ultrasonically bondable to the soft material and having a relatively slight adhesive affinity for the soft material;

actuator means for controlling the fluid conduit by moving the valve member relative to the valve seat member;

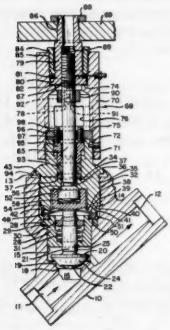
ultrasonic transducer means for producing both the formation of an ultrasonically welded bond joint between the first sealing surface of the valve member and the second sealing surface of the valve seat member to provide a closed sealed position and the separation of the ultrasonically welded bond joint to release the valve member from the valve seat member to provide an open valve position including clamping means for holding the respective sealing surfaces directly against each other while in their solid state during the formation of the welded bond joint directly between the sealing surfaces as they remain in their solid state; and

means for actuating the ultrasonic transducer means at a frequency characteristic of the materials of the first sealing surface and the second sealing surface member to effectuate the formation and separation of the ultrasonic welded bond joint directly between the sealing surfaces while the respective sealing surface materials are in a solid state whereby a fluid-tight sealing bond joint can be effectuated and the sealing surface materials can be subsequently released with relatively slight adhesive interaction and deformation of the respective sealing surfaces thereby permitting repetitive fluid-tight bonding of the sealing surfaces.

3,874,636
SEALED VALVE AND RELATED STRUCTURE

Earl A. Bake, Pittsburgh, and William G. Lunt, Monroeville, both of Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Nov. 19, 1973, Ser. No. 417,381
Int. Cl. F16k *31/50*
U.S. Cl. 251—335 A **16 Claims**



1. A valve assembly comprising a valve body defining an inlet passage and an outlet passage intersecting a body cavity, a valve seat,

flow controlling means in said cavity including a valve closure element mounted for axial movement toward and away from said valve seat,

a bonnet assembly fixed to said body to close said cavity and including plunger means disposed for axial movement toward and away from said valve seat,

a dome-shaped metal diaphragm disposed between said flow controlling means and said bonnet assembly to seal at least a portion of said body cavity on one side of the diaphragm from fluid on the opposite side thereof,

a diaphragm contacting surface on said plunger means comprising a flat center portion, a gradual convexly curved surface extending radially outward from said center portion and four surfaces of greater slope than said convexly curved surface equally spaced around the periphery of said diaphragm contacting surface and extending inward toward said center portion, and

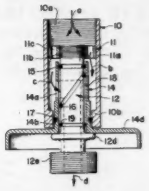
means for axially moving said plunger means to contact the domed surface of said diaphragm and deflect said diaphragm whereby said valve closure element is moved to sealingly engage said valve seat and close said inlet passage.

3,874,637
CANTED GASKET VALVE CONSTRUCTION

Lloyd K. Jones, and David A. Yanov, both of Morgantown, W. Va., assignors to Elk Manufacturing Company, Inc., Morgantown, W. Va.

Filed Oct. 31, 1973, Ser. No. 411,246
Int. Cl. F16k *31/44*
U.S. Cl. 251—345 **14 Claims**

1. In an improved valve that is suitable for draining-off liquid from a container, a hollow longitudinally extending housing, a longitudinally extending stationary stem part, and a rotatable operating sleeve part; said housing having an open inlet first end portion, having an opposite open second end portion, and having a central chamber connecting said end portions; said stem part being threadably secured at one end thereof within said inlet first end portion of said housing to extend in a spaced relation along said central chamber from the said first end portion of said housing, said stem part having an end port and a side port connected together by an angular shaped bore therein to define a liquid passageway therealong, said sleeve part having an open end facing said inlet first end portion and extending along the central chamber in a rotatable, concentrically spaced-apart, enclosing relation along and about said stem part and having an open port portion through its side wall for movement into and out of open alignment with the side port of said stem; said sleeve part having an operating portion extending outwardly through said second end portion of said housing and having a shoulder portion cooperating with said housing for positioning said sleeve part in a rotatable operating position within said housing and concentrically about said stem part, means cooperating with said

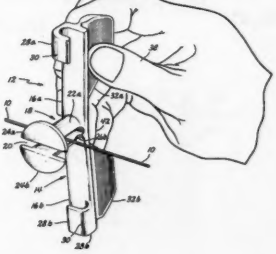


shoulder portion and said housing for retaining said sleeve part in position within said housing, first rotational annular sealing gasket means operatively positioned diagonally about the ouside of said stem part to define a control chamber between said stem and sleeve parts, said first gasket means sealing-off spacing between the outer periphery of said stem part and the inner periphery of said sleeve part in a diagonal cross-extending relation with respect to said side port, and second rotational annular sealing gasket means coperatively positioned between said sleeve part and said second end portion of said housing part for sealing-off a joint between the outer periphery of said sleeve part and the inner periphery of said housing adjacent said second end portion thereof.

3,874,638
WIRE OR ROPE TIGHTENER

Howard Langlie, and Albert T. Berg, Jr., both of Ellendale, Minn. 56026

Filed Sept. 27, 1973, Ser. No. 401,346
Int. Cl. B66f *1/00;* **A43c** *11/00*
U.S. Cl. 254—51 **12 Claims**



1. A one-piece plastic rope or wire tightener comprising an elongated panel body having upper and lower edges, a slotted generally cylindrical capstan projecting integrally from one side of said body, a first integral hook extending along the upper edge of said panel body toward said capstan from one end of said panel body, said first hook having a first portion projecting outwardly from said body and a second portion initially curving downwardly from said first portion and then extending in a generally parallel relation with respect to said panel body, a second integral hook extending along the lower

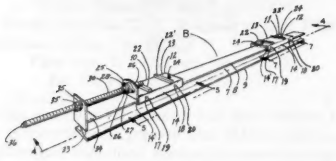
edge of said panel body toward said capstan, said second hook having a first portion projecting outwardly from said body and a second portion initially curving upwardly from the first portion of said second hook and then extending in a generally parallel relation with respect to said panel body, said hooks terminating in a spaced relationship with respect to said capstan, and respective means adjacent the ends of said body projecting integrally from the other side of said body for twisting said body in order to wrap a portion of the wire or rope to be tightened about said capstan.

3,874,639

TRAILER MOVING DEVICE

Perry A. Wilson, 208 St. Clair, Fairview Heights, Ill. 62269

Filed July 16, 1973, Ser. No. 379,660
Int. Cl. B66f *11/00*
U.S. Cl. 254—100 **8 Claims**



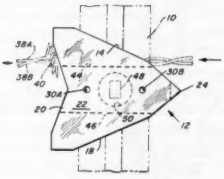
1. A load moving device comprising means defining, a track, a pair of first and second mobile load support members disposed on said track for movement therealong, each mobile load support member having a load-receiving surface for accepting a part of the same load whereby when said mobile support members are in load support condition said load serves to interconnect said load support members, rollers provided on each of said first and second mobile members for engaging said track and rendering said members mobile thereon, said first mobile load support member being normally freely rollable along said track, and means engaged to said mobile member operable for imparting motion thereto.

3,874,640

WIRE SUPPORT FOR USE IN INSTALLING WIRE TO A FENCE POST

Lawrence R. Wagner, 5539 E. 47th Pl., Apt. 218, Tulsa, Okla. 74135, and Joe A. Mach, Rt. 1, Talala, Okla. 74080

Filed Oct. 29, 1973, Ser. No. 410,902
Int. Cl. E04h *17/24*
U.S. Cl. 256—47 **8 Claims**



1. A wire support for use on a fence post adapted to removably support fence wire of the type having barbs at spaced intervals, comprising:

a body having a front surface, a back surface, a top surface and a rearward surface including side portions, the top surface being inclined downwardly away from said rearward surface, the top surface having a groove therein, said groove having an upper generally V-shaped portion communicating with a lower unobstructed narrow portion of said side portions having generally parallel sides, the narrow portion at the groove being of a width to freely receive fence wire vertically into and out of the groove and to slidably receive fence wire therethrough, the narrow portion of the groove adapted to be of less width than the fence wire barbs, the groove communicating with said rearward surface, said groove being adapted to freely permit the barbed wire to slide through in a first direction but prevents the barbed wire from sliding through in the opposite direction by the engagement of the barbs against said rearward surface side portions; and

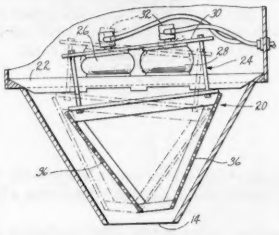
means adapted to removably support said body back surface to a fence post.

3,874,641

AGITATOR ASSEMBLY FOR A DISCHARGE HOPPER

Peter J. Tolan, 137 Elm, Scituate, Mass. 02066

Filed Aug. 15, 1973, Ser. No. 388,592
Int. Cl. B01f *11/00*
U.S. Cl. 259—37 **6 Claims**



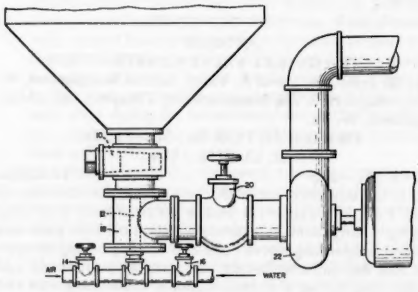
1. An agitating device for use with a discharge hopper of the type having side walls and a discharge opening, said device comprising a support and an agitator member secured to the support by a pair of spaced fluid extensible means, and means for actuating said fluid extensible means alternately.

3,874,642

SLURRY UNLOADING OF BULK ALKALINE EARTH METAL CARBONATES

Arvel O. Franz, and John Lawrence Gray, both of c/o Chemical Products Corporation, Cartersville, Ga. 30120

Division of Ser. No. 141,971, May 10, 1971, which is a continuation-in-part of Ser. No. 625,633, May 1, 1968, Pat. No. 3,533,821. This application Mar. 4, 1974, Ser. No. 447,882
Int. Cl. B28c *5/06*
U.S. Cl. 259—147 **9 Claims**



1. In a process wherein an alkaline earth metal carbonate is contained in a storage container and removed therefrom as an aqueous slurry, the improvement which comprises steps of

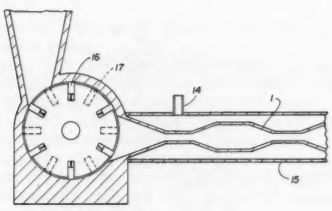
a. storing said carbonate in the form of an autogenously dispersible carbonate composition consisting essentially of an alkaline earth metal carbonate which has been essentially completely deflocculated with an ultrahydrophilic dispersant and the resulting dispersion dried under conditions which are non-destructive of said ultrahydrophilic dispersant;
b. introducing an aqueous liquid into the mass of said carbonate composition at a point in said container below the major mass of said carbonate composition;
c. continuing said aqueous liquid introduction until the amount of said aqueous liquid is sufficient to provide a fluid slurry of said carbonate;
d. introducing non-reactive gas under pressure into the mass of said carbonate and aqueous liquid at a point near the bottom of said storage container at the conclusion of step (c) to effect substantial homogenization of said carbonate composition and aqueous liquid to form a generally uniform slurry thereof; and
e. removing said slurry from said storage container.

3,874,643

METHOD AND APPARATUS FOR PLASTICIZING AND MIXING MATERIALS UNDER HIGH PRESSURE

Zareh Lorenian, Friedrichsplatz 16, and Eugenia Lorenian, both of Mannheim, Germany

Filed May 18, 1973, Ser. No. 361,428
Claims priority, application Germany, May 18, 1972, 2224235; Aug. 7, 1972, 2238853
Int. Cl. B29b *1/06, 3/00*
U.S. Cl. 259—185 **7 Claims**



1. Method of conveying positively, uniformly and free of pulsations, pulverulent or granular thermoplastic or thermosetting material while simultaneously plasticizing, mixing and homogenizing the material, which comprises initially feeding the material to a rotary device, and simultaneously subjecting the material to alternating horizontal and vertical compressions of the material by conveying the material through a selectively coolable and heatable tube having at least one passageway therein of alternately narrow and wide sections to effect plasticizing, mixing and homogenizing the material.

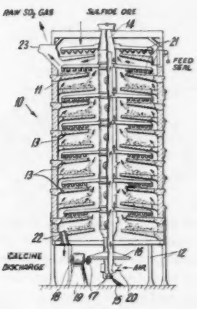
3,874,644

RABBLE CLEANING DEVICE

George R. Grimes, decreased, late of Burgettstown, Pa. (Mary E. Grimes, executrix), assignor to Amax Inc., New York, N.Y.

Filed Mar. 7, 1974, Ser. No. 448,842
Int. Cl. F27b *9/18*
U.S. Cl. 266—20 **4 Claims**

1. The combination of a rabble arm and a rabble arm cleaning device comprising,
a rabble arm extending radially outward from a vertically disposed rotatable shaft for moving said rabble arm in a circular path,
said rabble arm having blades extending downwardly therefrom for contacting and raking particulate metalliferous material in a roasting hearth,
and a rabble arm cleaning device cooperably associated with said rabble arm comprising a hammer assembly pivotally mounted to said rabble arm,
said pivotally mounted hammer assembly having a weighted longitudinal member disposed below the pivot and extending longitudinally of said rabble arm in gravity contact with said blades, and a cam-reacting member disposed above said pivot with a free end extending above said rabble arm,



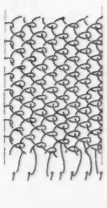
said cam-reacting member and said weighted member forming a coacting couple about said pivot,
such that during rotary movement of said rabble arm in a hearth, said cam-reacting member is caused to strike a stationary cam disposed in the path of travel of said cam-reacting member, whereby said cam-reacting member is caused to rock about the pivot to raise and release said weighted member which strikes said blades to dislodge any particulate material adhering thereto.

3,874,645

PERMEABLE LAMINATED COMPOSITE UNIT FOR PHYSICO-CHEMICAL PROCESSING

Gerard Aguinet, Meudon; Jean Manoury, Ville D'Avray, and Edouard Martin, Saint Cloud, all of France, assignors to Societe Anonyme Products Chimiques Ugine Kyhlman, Paris, France

Continuation-in-part of Ser. No. 175,588, Aug. 27, 1971. This application Oct. 9, 1973, Ser. No. 404,154
Claims priority, application France, Sept. 4, 1970, 70.32304
Int. Cl. B01j *9/04*
U.S. Cl. 267—112 **3 Claims**

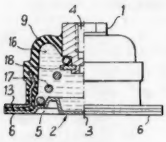


1. In a process for gaseous chemical or physical processes operated over a wide range of temperatures employing a fragile sheet of material chemically or physically active in the process, the improvement comprising a lattice support formed of an articulated cloth consisting of helixes of wire made of a refractory metal alloy, said helixes being assembled parallel to each other by screwing the adjacent helixes with one another, said cloth being stretched in an appropriately shaped frame with an extension of about 2% in length in all directions.

3,874,646
VIBRATION INSULATORS

Pierre Vernier, Lausanne, Switzerland, assignor to ARFINA Anstalt fur continentale und Vebersee-Finansinteressen, Vaduz, Liechtenstein

Filed Dec. 18, 1973, Ser. No. 425,934
Int. Cl. F16f *3/07*
U.S. Cl. 267—136 **13 Claims**

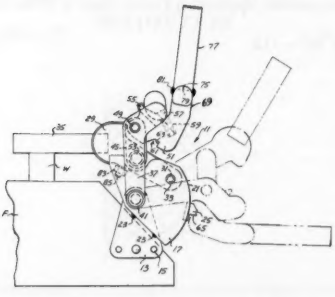


1. An insulator against vibrations, comprising in combination first and second rigid members adapted to be attached respectively to two parts of a system subjected to vibrations, for insulating one part from the other, one of the rigid members having a flattened shape, a sealed envelope of deformable resilient material connecting the two members with a portion at least of the said envelope turned inwardly to impart the shape of a cup to said envelope, said inwardly turned portion being flexible and receiving at its center the other of the said members, and a fluid of high viscosity filling the interior of the said envelope.

3,874,647
TOGGLE CLAMP WITH POSITIVE LATCH AND CLAMP ACTUATING HANDLE

Leland F. Blatt, 31915 Groesbeck Hwy., Grosse Point Shores, Mich. 48026

Continuation-in-part of Ser. No. 326,899, Jan. 26, 1973, Pat. No. 3,792,853, which is a continuation-in-part of Ser. No. 292,877, Sept. 28, 1972, Pat. No. 3,782,712. This application Nov. 28, 1973, Ser. No. 419,611The portion of the term of this patent subsequent to Feb. 19, 1991, has been disclaimed.
Int. Cl. B25b *5/12*
U.S. Cl. 269—228 **9 Claims**



1. In a toggle clamp having a pivot base mountable upon a support; a pair of upright parallel spaced guide plates secured upon said pivot base in a pre-selected angular position; a pivot arm guidably positioned between said plates and at one end pivotally mounted upon said plates and terminating in a clamp arm adapted to retainingly engage a workpiece on said support; a U-shaped handle link overlying said guide plates and at its free ends pivotally mounted upon said side plates; a pair of spaced arm links at their one ends pivotally mounted upon said handle link coplaner with said guide plates, and at their lower ends engaging opposite sides of and pivotally connected to said pivot arm; a latch between said arm links at their upper ends and pivotally mounted upon said handle link; said latch having a transverse detent notch; a latch plate transversely spanning and connected to the outer side edges of said guide plates; said latch notch on retracting movement of said handle link yieldably receiving said latch plate anchoring the handle link in a retracted release position; the improvement comprising:

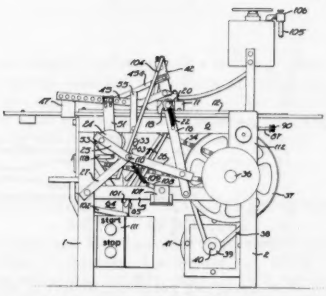
a latch handle on said latch;

and an operating handle at one end secured at a pre-selected angle to the end of said latch handle, in a plane transverse to the plane of movement of the latch, adapted to manually rotate said latch to disengage it from the latch plate; and further adapted on rotation in a counter-clockwise direction to rotate said clamp arm into work-piece securing position, and successively in the opposite direction, to rotate said clamp arm and latch to a retracted release position.

3,874,648
SHEET SHINGLING MACHINE

Francis P. King, S. 1119 Bernard; Thomas T. King, S. 702 Washington St., both of Spokane, Wash. 99204, and Earnest A. Sprow, E. 6315 Alki, Spokane, Wash. 99206

Filed Jan. 31, 1973, Ser. No. 328,280
Int. Cl. B42b *1/02*
U.S. Cl. 270—53 **11 Claims**



6. A sheet shingling machine comprising:

a supporting framework;

a holder movably mounted to the framework for supporting a stack of sheets such as checks;

drive means for reciprocating the holder between a first position and a remote position along a prescribed path of travel;

sheet feeding means mounted to the framework adjacent said first position of said holder for sequentially gripping and holding the top sheet of the stack while the holder is at said first position and for releasing the sheet while the holder is at said remote position;

said sheet feeding means being comprised of a movable suction head mounted to the framework for upward and downward movement, operable to lift the top sheet from the stack when the holder is in the first position and to lower the lifted sheet when the holder is in the remote position:

a carrier movably mounted to the framework for receiving the sheets released by the sheet feeding means;

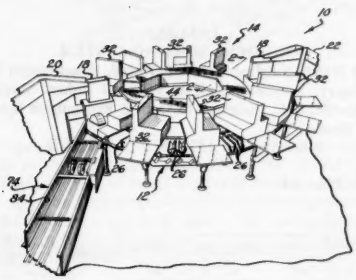
means operatively connected between the drive means and said sheet feeding means for causing said upward and downward movement of said suction head in timed relation to movement of said holder between its first and remote positions;

and means on said framework for advancing said carrier a prescribed distance relative to the framework after receiving each sheet released by said sheet feeding means.

3,874,649
METHOD AND APPARATUS FOR STUFFING NEWSPAPERS OR FORMING SIMILAR SHEET MATERIAL ASSEMBLAGES

Robert A. Bryson; Douglas T. Steckel; James R. Moser, all of Easton, Pa., and Robert M. Silva, Milford, N.J., assignors to Harris-Intertype, Cleveland, Ohio

Filed Sept. 11, 1972, Ser. No. 287,810
Int. Cl. B65h *5/30*
U.S. Cl. 270—55 **15 Claims**



1. An apparatus comprising a plurality of movable upwardly opening pocket means,

a first group of bottom-feed hopper means disposed adjacent to each other along a first path length for sequentially feeding sheet material to at least some of said pocket means, each of said hopper means of said first group of hopper means having a bottom portion,

a second group of bottom-feed hopper means disposed adjacent to each other along a second path length which is different than said first path length for sequentially feeding sheet material to at least some of said pocket means, each of said hopper means of said second group of hopper means having a bottom portion,

drive means for moving at least some of said pocket means along said first path length past the bottom portion of each hopper means of said first group of hopper means to assemble in each of these pocket means in turn an item formed of sheet material received from said first group of hopper means and for moving at least some of said pocket means along said second path length past the bottom portion of each hopper means of said second group of hopper means to assemble in each of these pockets means in turn an item formed of sheet material received from said second group of hopper means,

conveyor means for transporting items formed of sheet material received from said first group of hopper means and items formed of sheet material received from said second group of hopper means in a single stream of items to a receiving station,

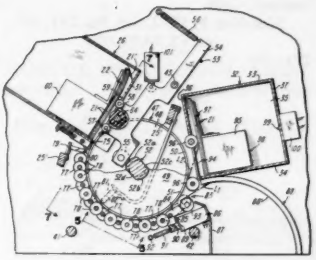
means disposed at a first delivery station for delivering from at least some of said pocket means to said conveyor means a first series of items made up of sheet material fed from said first group of hopper means, and

means disposed at a second delivery station spaced apart from said first delivery station for delivering from at least some of said pocket means to said conveyor means a second series of items made up of sheets of material fed from said second group of hopper means and for interspersing said second series of items with said first series of items to form a single stream of items.

3,874,650
RECORD SEPARATING, READING, AND DELIVERING APPARATUS

Horst L. Steigerwald, and Gilbert B. Clift, Jr., both of Miamisburg, Ohio, assignors to The Monarch Marking System Company, Dayton, Ohio

Filed Jan. 5, 1973, Ser. No. 321,170
Int. Cl. B65h *3/06, 29/60*
U.S. Cl. 271—4 **16 Claims**

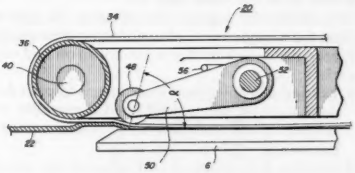


1. Record reading apparatus, comprising: a hopper for holding a stack of sheets, first and second feed wheels, the first feed wheel being disposed relative to the hopper to cooperate with the leading marginal end of a sheet at the end of the stack, the second feed wheel being disposed relative to the hopper to cooperate with the sheet at the end of the stack between its leading and trailing ends, the first feed wheel comprising spaced-apart feed wheel members, a shaft for mounting the feed wheel members, a cam carried by the shaft and disposed between the feed wheel members, means including an electric motor for continuously driving the shaft and the second feed wheel, a follower driven by the cam for contacting the sheet at the end of the stack for alternately moving the stack into and out of cooperation with the first and second feed wheels, and means including a read head disposed between the feed wheel members for reading data on the sheet as the sheet is being fed.

3,874,651
IMPROVED REGISTRATION EDGE FOR AUTOMATIC DOCUMENT HANDLER

Jeffery L. Sisson, Macedon, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 26, 1974, Ser. No. 464,395
Int. Cl. B65h *9/06*
U.S. Cl. 271—4 **3 Claims**



2. In a document handling apparatus for moving documents into copying position on the platen of a document copying machine, the combination of:

register means associated with the platen for aligning documents placed on the platen against an edge of said register means, said edge being formed to provide an included angle with the platen in the range of 79°–84° to provide a knife-like portion on said edge; and,

document feed means adapted for contact with said register means for moving documents therebetween onto the platen and against said register means, the top portion of

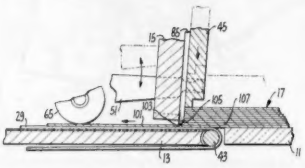
said register edge being constantly sharpened by relative movement between said document feed means and said register means to prevent rounding-off of the top portion of the register edge.

3,874,652

APPARATUS FOR FEEDING SHEET MATERIAL FROM THE BOTTOM OF A STACK

Robert A. Bilbrey, Orinda, Calif., assignor to Decision Consultants, Oakland, Calif.

Filed May 8, 1972, Ser. No. 251,187
Int. Cl. B65h *3/04*
U.S. Cl. 271—35 **18 Claims**



1. A sheet feeding mechanism, comprising:
a flat surface including a stationary portion for supporting a stack of sheets and another portion adjacent thereto that is movable away from the stationary portion,
means for moving said movable surface portion in a direction away from said stationary surface portion,
a wall structure extending upward above the movable portion of said supporting surface adjacent the stationary portion to define one edge of a supporting surface for a stack of sheets and to hold the sheets of a stack placed thereon against lateral movement off the stationary surface, said wall surface being positioned with a lower edge held a distance above the movable portion of said supporting surface to form a controlled gap therebetween, whereby the gap may be made large enough to allow only a single sheet to pass thereunder,
means adjacent said wall on its side toward the stationary surface portion and positioned over the movable portion of said supporting surface for providing a downward force on a stack of sheets carried by the supporting surface, thereby to increase the frictional engagement between the bottom sheet of a stack with the movable portion of the supporting surface,
means removed laterally a distance from the supporting surface for engaging with the movable surface portion a bottom sheet of said stack that has been partially removed from the stack, and
control means for sequentially effecting the following actions for a single cycle of operation to remove a bottom sheet from a stack of sheets positioned on said supporting surface:
1. causing said downward force means to push downward on a stack of sheets positioned thereunder while the moving means maintains the movable surface portion stationary,
2. causing said moving means to move the movable surface portion laterally away from the stationary supporting surface and to deliver the bottom sheet to said engaging means while the downward force means urges the bottom sheet against the movable surface portion, and
3. causing said downward force means to stop pushing downward on a stack of sheets positioned thereunder after a bottom sheet has been moved by the movable surface portion under the wall structure to said engaging means.

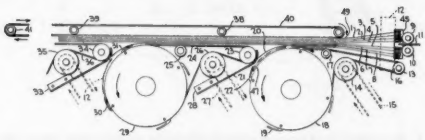
11. For a sheet material feeding device having a moving means for engaging the bottom sheet of a stack of sheets for moving it away from the stack and a wall structure adjacent one edge of the stack to hold back all the sheets the stack except for the bottom, the method of optimally adjusting the gap between the lower edge of said wall structure and said sheet moving means, comprising the steps of:
selecting a sheet of the type to be fed by said device,
folding a sheet of gauge material over one edge of said document sheet,
placing the composite thickness of said document sheet and two layers of said gauge sheet material in said gap,
adjusting said wall structure until its lower edge engages and holds the composite thickness of said document sheet and two layers of gauge sheet material,
withdrawing said document sheet from between the folded gauge sheets, and
removing said folded gauge sheet material from said gap.

3,874,653

DOCUMENT SORTING SYSTEM

Rolland Welch, Fairfax; Robert Springer, Woodbridge; Brian Mayberry, Alexandria, all of Va., and Robert Sheppard, Poolesville, Md., assignors to Optical Recognition Systems, Inc., Reston, Va.

Filed Apr. 30, 1973, Ser. No. 355,633
Int. Cl. B65h *29/60*
U.S. Cl. 271—64 **14 Claims**



1. A sorting system comprising a document transport path, means for transporting a document along said path, a plurality of elongated flexible strips forming a plurality of document transport channels there between, each said channel terminating at a different sorting area at one end thereof and at a channel selection station adjacent said document transport path at the other end thereof, said strips at said other end being laterally displaceable to join a selected one of said channels with said transport path, and means attached to said strips at the other end thereof for securing said strips to coil members which are mounted on a magnetic apparatus comprising two pairs of magnets which are separated from each other by an air gap, the magnets of each pair of magnets sandwiching a center piece of high permeability material between them, with the same pole of each magnet facing said center piece, said center piece extending from one pair of magnets to the other in said air gap, said coil members being mounted for movement on said center piece, whereby said coils will be deflected towards one pair of magnets when current is sent through the coils in one direction and towards the other pair of magnets when current is sent through in the other direction.

3,874,654

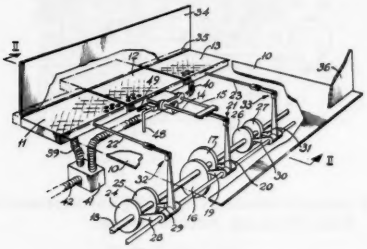
MECHANISM FOR FEEDING CARDBOARD OR LIKE BLANKS

Barry Holt, New Mills, and Norman Frank Buckley, Didsbury, both of England, assignors to Henry Simon Limited, Stockport, Cheshire, England

Filed May 11, 1973, Ser. No. 359,329
Claims priority, application United Kingdom, May 25, 1972, 24673-72
Int. Cl. B65h *3/12*
U.S. Cl. 271—99 **12 Claims**

1. Mechanism for feeding cardboard or like blanks one at a time from the underside of a stack thereof comprising a table, the forward part of which is comprised by three reciprocably mounted suction feed cups adapted, in use, to pull the

leading edge of the lowermost blank in the stack positively downwardly and upon forward stroke progress it forwardly beneath a feed gate, a pair of feed rollers defining a nip forwardly of said feed gate having a relieved central section, means for moving all of said cups together on the forward stroke in such relation that the central reciprocatory feed cup on its forward stroke advances to a greater extent than the



feed cups on either side thereof to carry the blank right into the nip between the feed rollers, part of the central feed cup then being located within the relieved central section of the feed rollers, and the reciprocatory feed cups to either side are arrested on the forward stroke short of the feed roller nip once they have aided in carrying the leading edge of the blank beneath the feed gate.

3,874,655

MECHANISM FOR FEEDING CARDBOARD OR LIKE BLANKS

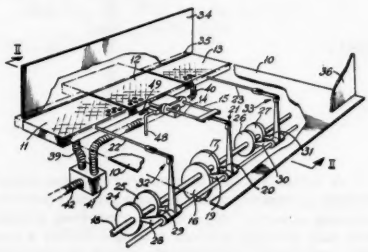
Robert William Allen, Poynton, and Norman Frank Buckley, Didsbury, both of England, assignors to Henry Simon Limited, Stockport, Cheshire, England

Filed May 11, 1973, Ser. No. 359,332

Claims priority, application United Kingdom, May 26, 1972, 2490/72

Int. Cl. B65g *59/06*

U.S. Cl. 271—99 **8 Claims**



2. Mechanism for feeding cardboard or like blanks one at a time from the underside of a stack thereof comprising a table, which is adapted to support said stack, and the forward part of which includes a reciprocatory suction feed cup adapted on its forward or feeding stroke to pull the leading edge of the lowermost blank in the stack positively downwardly and progress it forwardly beneath a feed gate and carry it into the nip between a pair of feed rollers said suction cup being comprised by a box having a perforated top wall and a flat base with a port therein adapted to be reciprocated slidably over a fixed block having first and second recesses connected with a suction source and atmosphere respectively, the arrangement being such that on the forward stroke said port communicates with the first recess such that suction is maintained until the blank is taken up by the feed rollers when the port communicates with the second recess such that no suction is applied from that point and during at least the initial part of the return stroke, said reciprocatory feed cup being disposed between two further reciprocatory suction feed cups lying one on each side thereof, and said further suction feed cups being adapted to advance with the central feed cup but to be arrested once they have carried the leading edge of the blank beneath the feed gate whilst the central feed cup continues forwardly to carry the blank into engagement with the feed rollers.

3,874,656

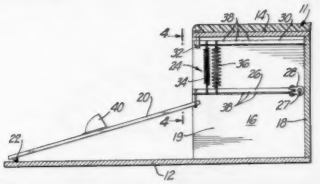
EXERCISE APPARATUS FOR SKIERS

Karl F. Wintersteller, 231 Los Padres, Rowland Heights, Calif. 91748

Filed Aug. 17, 1972, Ser. No. 281,332

Int. Cl. A63b *69/18*

U.S. Cl. 272—58 **11 Claims**



1. Exercise apparatus for skiers comprising:

a chair,

a pair of simulated skis at the front side of said chair including ski-like slats extending forwardly and downwardly from said chair and foot cups between the ends of said slats, and

means supporting the rear ends of said ski slats on said chair for movement of said rear slat ends in directions transverse to said slats.

3,874,657

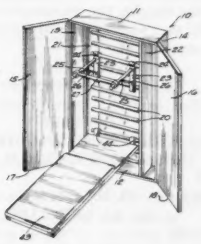
EXERCISE APPARTUS INCLUDING STALL BARS AND EXERCISE EQUIPMENT MOUNTED THEREON

Frank J. Niebojewski, 965 Tower Hill Dr., Brookfield, Wis. 53005

Continuation-in-part of Ser. No. 43,337, June 4, 1970, abandoned, and a continuation-in-part of Ser. No. 294,975, Oct. 4, 1972, abandoned. This application Mar. 29, 1973, Ser. No. 346,168

Int. Cl. A63b *17/04, 21/10, 13/00, 23/04*

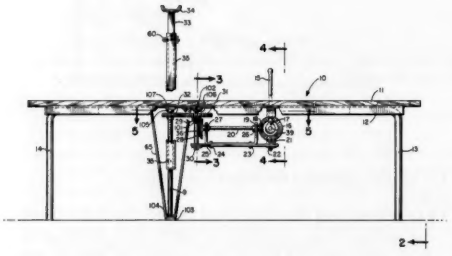
U.S. Cl. 272—58 **12 Claims**



1. An exercise apparatus comprising a plurality of vertically spaced stall bars mounted in a supporting structure, a pair of separate parallel bar means each of which includes a mounting

means for releasably attaching the corresponding parallel bar to the stall bars with the parallel bars projecting outwardly in parallel relationship from the stall bars, said parallel bars including grippable free outer end portions for hand gripping by exercising personnel and further adapted to telescopically receive auxiliary equipment, and auxiliary exercise equipment including telescoping attachment members adapted to detachably telescope over the free end of the parallel bars to provide a direct support of such auxiliary equipment.

3,874,658
ONE-MAN ADJUSTABLE BENCH PRESS RACK
Arthur M. Flowers, 1108 Gayle St., Mobile, Ala. 36605
Filed Feb. 22, 1974, Ser. No. 444,847
Int. Cl. A63b *21/00*
U.S. Cl. 272—58 **11 Claims**



4. A one-man adjustable bench press device designed for use in connection with weight lifting exercises comprising:

a bench board;

a multiplicity of support legs attached to said bench board to form a bench;

a mechanical weight support means adjustable vertically and associated with said bench board for supporting exercising weights when not being used in exercising; and adjustable means associated with said bench board and said weight support means and operable by the user with no substantial physical exertion when lying prone on said bench board for raising and lowering said weight support means relative to said bench, said adjustable means being comprised of a manually operable gear drive train; whereby the weights can be moved by the user with respect to the user without substantial physical strain or the need for an assistant.

3,874,659
EXERCISING MACHINE
Benjamin M. Aharoni, 5326 Radford St., North Hollywood, Calif. 91607
Filed Apr. 30, 1973, Ser. No. 355,584
Int. Cl. A63b *21/00*
U.S. Cl. 272—79 R **7 Claims**

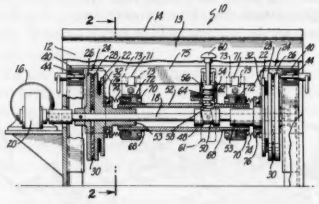
1. In an exercising machine, the combination of:

a. a reel;

b. a cable wound on said reel;

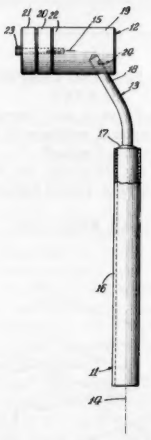
c. a motor;

d. constant-cable-tension drive means, including a slip clutch connecting said reel to said motor, for causing said motor to apply a constant tension to said cable; and



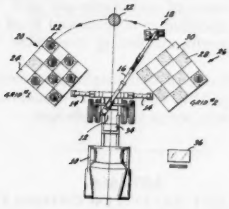
e. means for alternately increasing and decreasing the resistance of said slip clutch to slippage.

3,874,660
EXERCISE DEVICE
Chester Arthur Brethen, 2138B Bugen Rd., Glenview, Ill. 60025
Filed July 20, 1973, Ser. No. 381,210
Int. Cl. A63b *23/00*
U.S. Cl. 272—81 **8 Claims**



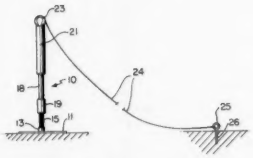
7. A device for use in isometric exercises comprising: a manually graspable handle having a grasping portion defining a turning axis and only a single connecting portion turned from said grasping portion; a weight having a preselected mass; and means connecting the weight eccentrically to said handle connecting portion to extend outwardly from the distal end of the handle connecting portion and space the center of said mass from said grasping portion axis beyond the distal end of the connecting portion to provide a preselected torque acting about said axis, said weight comprising a plurality of separable portions at the outer end of the weight spaced from said handle connecting portion for selectively adjusting the spacing of the center of gravity of said mass substantially perpendicularly from said axis while substantially maintaining the spacing of the center of gravity from the grasping portion in a direction parallel to said axis, said handle grasping portion having a length substantially greater than the width of a user's hand to permit the user to grasp the handle at any one of a plurality of different positions lengthwise thereof to provide a variable torque acting transversely to said axis.

3,874,661
LOG LOADING CONTEST
William L. McBain, Raleigh, N.C., assignor to Amark Industries, Inc., Portland, Oreg.
Filed Sept. 17, 1973, Ser. No. 398,206
Int. Cl. A63f 9/00
U.S. Cl. 273—1 R 2 Claims



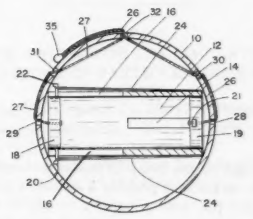
1. A game for testing the skill of log loading operators comprising; a log loading machine having an articulated boom, a grapple carried by the boom, controls for maneuvering the grapple and boom to pick up and move log sections within the reach of the boom, and a control station from which an operator manipulates said controls; two grid areas located within the reach of the boom, each grid area having certain inner areas designated as log holding areas and other inner areas designated as off limit areas and said designated log holding areas of one grid area being mismatched with the designated log holding area of the other grid area relative to the reach of the boom to require both linear and swinging movement of the grapple in moving log sections from one grid area to the other grid area; and timing means for timing successive operators in their operation of the log loading machine used for the movement of log sections from the designated holding areas of one grid area to the designated holding areas of the other grid area.

3,874,662
BATTING TEE
Charles M. Harrington, Hattiesburg, Miss., assignor to CHM Enterprises, Inc., Hattiesburg, Miss.
Filed Nov. 19, 1973, Ser. No. 417,334
Int. Cl. A63b 69/40
U.S. Cl. 273—26 E 1 Claim



1. The combination of a batting tee and a ball means in which the tee supports a ball in a position to be struck by a bat, said batting tee comprising a base member adapted to be placed on the ground, an elongated relatively stiff coil spring connected at one end to said base member and extending upwardly therefrom along a generally vertical axis, a first sleeve having a first portion engaging the other end of said spring and being disengageable therefrom, a rigid post attached to another portion of said first sleeve and normally being located along a vertical axis, an elongated flexible resilient second sleeve telescopically receiving the upper end of said post, clamp means for connecting said second sleeve to said post in fixed adjusted position, said ball means comprising a ball adapted to be placed on the upper end of the second sleeve, a stake having an elongated shank adapted to be driven into the ground in spaced relationship with the base member of said tee, the upper end of said stake being disposed above the ground, a tether having one end attached to said ball and the other end attached to the upper end of said stake, whereby said coil spring normally maintains said post and said sleeves in an upright ball supporting position along a generally vertical axis but bends in an arcuate path when the resilient sleeve is struck by a bat and thereafter automatically returns the post and sleeve to an upright position and the tether limits the distance the ball travels when struck while permitting the direction of travel to be observed.

3,874,663
TOY BALL
William J. Kahle, Rt. 3—Box 12 A, Athens, Minn. 55040
Filed Jan. 2, 1974, Ser. No. 429,486
Int. Cl. A63b 37/10, 69/40
U.S. Cl. 273—26 R 4 Claims



1. A toy ball having the capability of changing its own spin velocity comprising a generally spherical outer shell and having apertures therein; an elongated tubular passageway mounted inside said outer shell and extending generally from one side of said outer shell through the center of said spherical outer shell and to the other side of said outer shell; movable weight means slidably located in said tubular passageway for altering the angular velocity of said outer shell according to changes of position of said weight means in said tubular passageway; spring means in cooperation with said weight means for urging said weight means towards a position at a first predetermined radius from the center of said outer shell; and tensioning member means connected to said weight means and extending outside said outer shell through said apertures for permitting a thrower to displace said weight means from said predetermined radius position to a second predetermined radius position and hold the weights in the displaced position while throwing the ball, the release of said tensioning member means and the movement of said weight means causing said alteration of angular velocity.

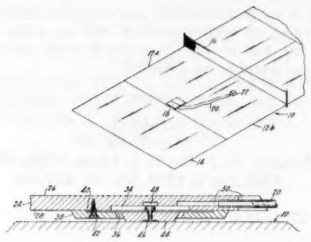
3,874,664
IMPACT SENSING TARGET
William R. Faurot, and Bjorn G. Bjornsen, both of Whitefish Bay, Wis.
Filed Oct. 29, 1973, Ser. No. 410,889
Int. Cl. A63b 63/00
U.S. Cl. 273—29 A 17 Claims

1. A target positionable on a relatively unyielding surface for sensing the impact of objects comprising:

a stiff panel having means for locating said panel on the surface;

a sensor including a cavity in said panel having a diaphragm means mounted thereacross for sealing said cavity into a chamber and having means on said diaphragm means for engaging said surface; and

tubular transmitting means connected to said chamber and having means for maintaining the transmitting means and chamber at ambient pressure,



said diaphragm means being formed of a material possessing sufficient stiffness to provide a transient deflection from a quiescent position responsive to object impact forces sufficient to generate a transient pneumatic pulse for travel down said transmitting means.

3,874,665

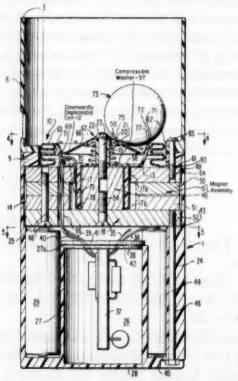
BALL PUTTING CUP AND METHOD OF EJECTING BALL FROM SAME

Robert P. McCulloch, Los Angeles, and Stephen H. Smith, San Pedro, both of Calif., assignors to McCulloch Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 186,289, Oct. 5, 1971, abandoned. This application Sept. 8, 1972, Ser. No. 287,433

Int. Cl. A63b *57/00*

U.S. Cl. 273—34 A **7 Claims**



1. A golf cup comprising:

first means including a housing operable to be positioned at least partially below ground level, and open upwardly, and receive a downwardly moving golf ball;

second means including a diaphragm operable to impact a golf ball out of said housing;

said diaphragm defining a bse of said housing and being operable to undergo downward and upward flexing movement;

said diaphragm including a recess operable to receive and support a golf ball at random locations therein;

third means operable to effect golf ball impacting, upward flexing movement of said diaphragm; and

fourth means operable to actuate said third means in response to downward flexing movement of said diaphragm;

said upward flexing of said diaphragm being operable to impact said golf ball upwardly out of said housing, generally transversely across said diaphragm.

3,874,666

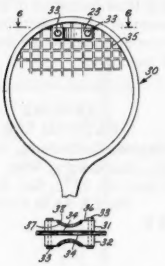
TENNIS RACKET HAVING INCORPORATED BALL RETRIEVAL MEANS

Peter Ross, 53 N. Fifth Ave., Long Branch, N.J. 07740

Filed Oct. 11, 1972, Ser. No. 296,575

Int. Cl. A63b *49/00*

U.S. Cl. 273—73 R **4 Claims**

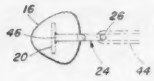


1. In combination, a tennis racket having a ball retrieval means attached thereto, said tennis racket including a handle element and a loop element connected thereto, said loop element having strings supported thereby, said strings defining interstices and a string plane; said retrieval means being disposed solely on said strings, said retrieval means including first and second blocks located respectively on opposite sides of said string plane and having interconnecting means passing through said interstices and said strings, the outer surface of at least one of said blocks having a curvilinearly-shaped portion, and tennis ball engaging means on said shaped portion of said outer surface.

3,874,667
DIE-CAST LIGHT-METAL RACKET AND STRINGING MEANS THEREFOR

Peter Christopher John Gallagher, and Gerald R. Kotler, both of Hightstown, N.J., assignors to N L Industries, Inc., New York, N.Y.

Division of Ser. No. 279,166, Aug. 9, 1972, Pat. No. 3,815,663. This application Dec. 26, 1973, Ser. No. 427,515
Int. Cl. A63b *51/00, 49/12*
U.S. Cl. 273—73 D **3 Claims**

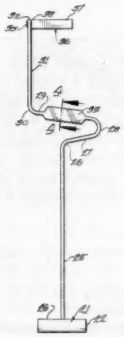


1. A die-cast, light-metal playing racquet comprising: a curvalinear head portion having a solid metal cross section and constructed and arranged to enclose a stringing area; a handle integral with said head portion; and stringing means comprising a separate implant encapsulated by said solid metal head portion, said implant consisting of a metal band conforming substantially to said curvalinear head portion and arranged with the plane of its major axis substantially perpendicular to the plane of said stringing area, and a plurality of individual string receiving members fastened to said metal band in spaced relationship therearound, said string receiving members comprising wire loops arranged to protrude from said head portion inwardly into said stringing area and in the plane thereof.

3,874,668
PENDULUM GOLF PUTTER

John H. Flege, 33 E. 40th St., Covington, Ky. 41015

Filed Jan. 17, 1974, Ser. No. 434,086
Int. Cl. A63b *53/14*
U.S. Cl. 273—81.3 **5 Claims**

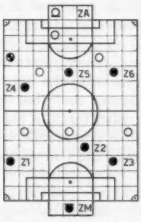


1. A golf putter club comprising:
an elongated club head having top and bottom surfaces, two side surfaces, and two end surfaces, with one of said end surfaces being the golf ball striking face;
a shaft having a main portion with one end affixed to the top surface at geometrical center of said club head with said shaft projecting vertically upwardly therefrom to a position spaced outwardly therefrom, said shaft at said position being bent into a general V-shaped configuration with the apex of said V-shape pointing forwardly of said club head in the direction of said ball striking face, said V-shaped portion having a bottom leg projecting at an angle to said shaft axis, and a top leg disposed at an angle to said shaft axis;
a handle member substantially coplanar and aligned with and formed on said top leg portion of said V-shaped shaft portion;
said shaft further extending from said top leg portion of said V-shaped portion in an upright vertical direction parallel to the axis of said main shaft portion adjacent said club head and terminating in a top end; and
a semi-circular band having a bight portion and opposed leg portions defining an arm receiving notch therebetween, said bight portion permanently affixed to said terminal end of said shaft with said band projecting symmetrical with said shaft in a direction forwardly of said shaft pointing toward said club head ball striking surface and being substantially parallel to said club head, said band adapted to receive an arm portion of an individual therein when the individual grips said handle portion in the hand associated with said arm whereby the golf putter can be actuated by the individual in a pendulum movement to strike the golf ball and propell the golf ball accurately in the desired direction and with the desired velocity.

3,874,669
ELECTRONIC DEVICE FOR THE SIMULATION OF AN ANIMATED GAME, IN PARTICULAR THE GAME OF FOOTBALL

Rosalba Ariano, Via Kennedy 21, 20097 S. Danado, Milanese, and Bartolomea Fontanella, Viale Angheria, 17/2, 20138 Milan, both of Italy

Filed Mar. 26, 1973, Ser. No. 344,628
Int. Cl. A63f *9/00*
U.S. Cl. 273—85 R **12 Claims**

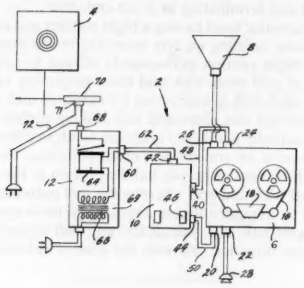


1. An electronic device for the simulation of an animated game between two teams moving a ball or other projectile across a playing field, said device comprising:
a. a display plane representing the playing field;
b. means for displaying at any time on said display plane the position of each of said team members;
c. means for representing on said display plane at any time the position of said ball;
d. means for comparing the position of said ball with the positions of the closest players of each team and for deriving signals representing the direction of each of said closest players therefrom;
e. means for changing the positions of said closest players toward the position of said ball, said comparing means indicating when the position of one of said closest players and said ball coincides;
f. and means for automatically causing said ball to move to a new position, said new position being dependent upon which of said closest players reached said ball and the probable direction in which said ball would be projected by said player.

3,874,670
AUTOMATED FIRING RANGE

Donald E. Weihl, 7705 W. Main St., Belleville, Ill. 62223

Continuation of Ser. No. 207,839, Dec. 14, 1971, abandoned. This application Nov. 30, 1973, Ser. No. 420,550
Int. Cl. F41j 9/01
U.S. Cl. 273—105.6 4 Claims



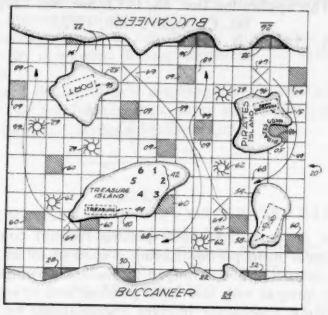
1. A firing range comprising: a tangible target of fixed size and shape which is movable between a generally obscured position and a highly visible firing position; target positioning means for physically moving the target between its obscured and firing positions; a recording and playback machine through which a single recording medium passes, the machine being capable of simultaneously recording two different commands on separate tracks of the recording medium, and further being capable of reproducing those different commands in the same sequence and time intervals as they were recorded; a microphone connectable to the machine such that audible firing commands directed into the microphone are recorded on one of the tracks of the recording medium; a speaker connected with the machine for emitting the audible commands recorded on said one track when they are reproduced by the machine; synchronizer means capable of generating inaudible commands, the synchronizer means being connected to the machine such that the inaudible commands are recorded on the other track of the recording medium and such that the inaudible commands when reproduced by the machine are received by the synchronizer means, the synchronizer means further being capable of amplifying the reproduced inaudible commands and being connected to the target positioning means for causing the target positioning means to physically change the position of the target when an inaudible command is received thereby.

3,874,671
GAME BOARD APPARATUS

Rex Duane Smith, Rt. 1, Box 168, Webb City, Mo. 64870

Filed Aug. 2, 1973, Ser. No. 384,927
Int. Cl. A63f 3/00
U.S. Cl. 273—134 AC 19 Claims

1. Game board apparatus comprising:
a. a board having indicia thereon providing a course of travel extending from one or more starting points to one or more points of destination so that players can move player position markers about the board from a starting point to a point of destination;
b. means representing the equivalent of money to be in the possession of each player;
c. a plurality of articles symbolic of cargo having a predetermined value to be purchased with the money in the possession of the players;
d. means for providing indications of a plurality of numerically different percentage markups in the value of the cargo and for associating a given percentage markup with each player who successfully moves his position marker to a point of destination with cargo in his possession but for preventing the amount of each percentage markup from being known to each player in advance of his reaching the point of destination; and
e. a plurality of articles symbolic of armament having a predetermined value to be purchased with the money in the possession of the players for the purpose of enhancing each player's ability to defend his cargo from loss enroute

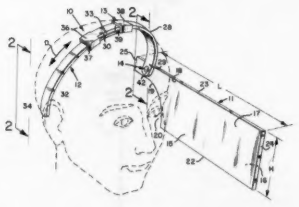


to a point of destination in proportion to the value of the armament in his possession,
whereby each player must make a business decision as to the amount of money to invest in the possibility of making a percentage markup on his cargo as compared with the amount of money to spend to defend his investment against potential loss.

3,874,672
GOLFER'S TRAINING AID

Gordon Zank, 3238 Isabel St., Rosemead, Calif. 91770

Continuation-in-part of Ser. No. 313,672, Dec. 11, 1972, abandoned. This application Oct. 15, 1973, Ser. No. 406,554
Int. Cl. A63b 69/36
U.S. Cl. 273—183 B 1 Claim



1. A blinder for aiding a golfer in concentrating on striking a golf ball, comprising:
a. a single totally non-transparent plate having an inner face, an outer face, a view blocking forward section and a rearward section;
b. means defining a cut-away zone formed in the plate rearward section to accommodate a golfer's ear;
c. a headband having,
c_1. a first resilient arcuate strip coupled to the plate, and,
c_2. a second resilient arcuate strip slidably coupled to the first arcuate strip;
d. a fastener coupling the first resilient arcuate strip to the rearward section of the plate, the fastener having a pivot element structured and positioned to allow frictional and swinging movement by the plate; and,
e. length adjustment means coupled to the headband for selectively expanding and diminishing the end-to-end

length of the headband, the length adjustment means having,

e_1. a first loop attached to the outermost end of the first resilient arcuate strip and arranged to slidably receive the second arcuate strip, and,

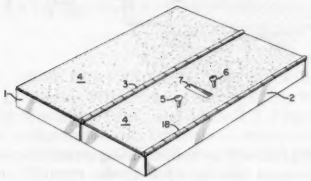
e_2. a second loop attached to the innermost end of the second resilient arcuate strip and arranged to slidably receive the first resilient arcuate strip.

3,874,673

DEVICE FOR DETERMINING THE LIE OF A GOLFERS STROKE

Franklin Beard, 14906 Cindywood, Houston, Tex. 77024

Filed July 19, 1973, Ser. No. 380,856
Int. Cl. A63b *69/36*
U.S. Cl. 273—186 R **5 Claims**



1. In a means for detecting the lie of a golfer's club upon contact with a ball, a platform having upstanding bristle members forming a turf-like top cover and a plate chute formed in said platform, said bristle members simulating grass and being on each side of the chute so that a ball may be played from either side, a severable plate adapted to be severed by the head of a swung golf club and retain a pattern of said head's travel therethrough, a plate seat slidably mounted in said chute and adapted to support said severable plate as the head of a golf club is swung therethrough, severing the plate in the travel path of the club head, a plate port in vertical alignment with said chute, and means for selectively raising and lowering said seat to move said plate into and out of the path of a golf club.

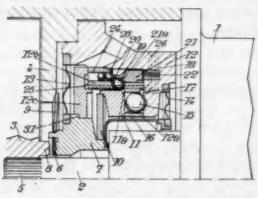
3,874,674

SEALING DEVICES BETWEEN A DRIVE MEMBER AND A DRIVEN MEMBER CONNECTED BY DISCONNECTABLE COUPLING MEANS

Roger Louis Germain, Maisons-Laffitte; Henri Andre Rouger, Courbevoie; Jean-Paul Vives, Gennevilliers, and Claude Duquenne, La Garenne, all of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France

Filed May 2, 1973, Ser. No. 356,390
Claims priority, application France, May 8, 1972, 72.16430
Int. Cl. E21b *33/00*
U.S. Cl. 277—8 **16 Claims**

1. Sealing device between a drive member and a driven member connected by disconnectable coupling means, comprising at least one annular seal situated in a plane perpendicular to the axis of rotation of the driven member, said annular seal being borne by a movable support which can be moved axially between an active position, in which it is urged towards a sealing face provided on the driven member, and an inactive position, in which it remains separated from said sealing face, actuating means for effecting axial movement of said movable support, said actuating means comprising two flexible devices acting in opposition on the movable support, namely a flexible opening device which tends to bring the movable support into its inactive position, and a flexible closing device which tends to bring the movable support into its active position, an axially displaceable support part for placing said flexible closing device selectively under tension upon displacement of the support part to an advanced position, and locking means actuable at will for selectively maintaining said support part in



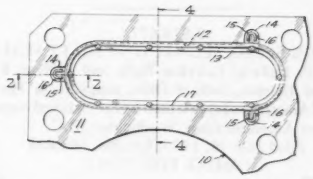
its advanced position in which it places said flexible closing device under tension.

3,874,675

METALLIC GASKET ASSEMBLY

Jerome G. Belter, Mount Prospect, and Dan C. Battistoni, Chicago, both of Ill., assignors to Dana Corporation, Toledo, Ohio

Filed Aug. 20, 1973, Ser. No. 390,008
Int. Cl. F16j *15/00*
U.S. Cl. 277—11 **11 Claims**



1. A metallic gasket assembly comprising, in combination, a main gasket body having a predetermined thickness, said main gasket body defining an insert opening and a plurality of tab recesses, a metallic insert having an outer periphery complementary with said insert opening positioned within said opening, said metallic insert including a plurality of outwardly extending tabs complementary with and positioned within said tab recesses, said main gasket body encompassing said metallic insert, each of said insert tabs having at least one embossment defined thereon, the outer edge of each of said tabs being positioned tightly against said main gasket body, whereby said metallic insert is secured to said main gasket body.

3,874,676

COOLING APPARATUS FOR SHAFT SEAL

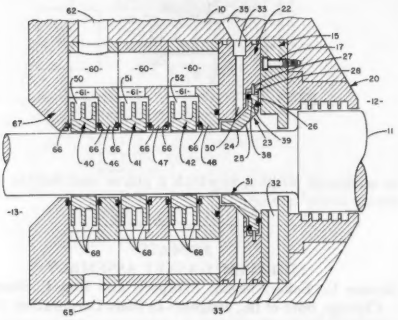
Owen S. Taylor, Jeannette, and Donald P. Ravicchio, Appolo, both of Pa., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Mar. 21, 1974, Ser. No. 453,651
Int. Cl. F16j *15/28, 15/40*
U.S. Cl. 277—22 **7 Claims**

1. In a shaft sealing device of the type wherein a fluid barrier is established between the shaft and a series of bushing seals to prevent high pressure working substances contained within a pressure vessel from escaping to surrounding areas of relatively lower pressure including a first bushing seal encompassing the shaft and being positioned adjacent to the high pressure region, at least one other seal bushing encompassing said shaft behind said first bushing in the direction of lower pressure and means to introduce sealing fluid into contact with the

shaft within the region encompassed by said first bushing whereby said fluid flows between said bushings and the shaft toward the region of lower pressure, the improvement comprising;

a flow passage in said pressure vessel being capable of carrying coolant into thermal communication with said sealing bushings,



means for continuously passing a flow of coolant through said passage whereby said bushings are maintained at or below a predetermined temperature level, and

sealing means to isolate the coolant flow from the flow of sealing fluid moving between the shaft and said bushings.

3,874,677

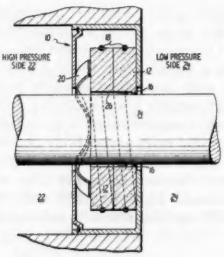
HIGH SPEED, SELF-ACTING SHAFT SEAL

Lawrence P. Ludwig, Fairview Park, and William F. Hady, Cleveland Heights, both of Ohio, assignors to The United States of America as represented by the National Aeronautics and Space Administration, Washington, D.C.

Filed July 19, 1973, Ser. No. 380,630

Int. Cl. F16j *15/16*

U.S. Cl. 277—27 **9 Claims**



1. A high-speed, self-acting shaft seal for use in sealing a rotating shaft between high and low pressure areas, the combination comprising:

a housing;

at least one ring seal disposed in said housing, said at least one ring seal having an aperture therein forming an inner cylindrical surface adapted to be disposed around said rotating shaft;

a dam seal at one end of said inner cylindrical surface of said at least one ring seal, and

means coupled to said cylindrical surface of said at least one ring seal adjacent to said dam seal for producing a net outward radial force only during rotation of said shaft whereby said inner cylindrical surface lifts out of surface contact with said shaft during rotation thereof.

3,874,678

SEAL MECHANISMS

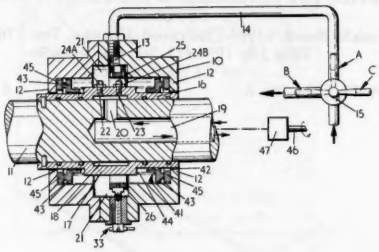
Charles William Potter, Manchester, England, assignor to Charles Weston & Company Limited, Pendleton, Salford, Lancashire, England

Filed May 30, 1973, Ser. No. 365,329

Claims priority, application United Kingdom, May 30, 1972, 25130/72

Int. Cl. F16j *9/00*

U.S. Cl. 277—29 **7 Claims**



1. A seal mechanism for encompassing a rotatable member having an internal passage open to the rotatable member exterior and along which fluid under pressure is to be transmitted via the seal mechanism, the seal mechanism comprising:

a. a stationary annular casing surrounding the rotatable member and having radially inwardly directly end walls,

b. a fluid inlet passage for ingress of fluid to the casing interior,

c. a co-axial sleeve within the casing and also surrounding the rotatable member for rotation therewith, the casing and sleeve between them defining an annular chamber and the sleeve being provided with two ports for allowing fluid communication between the annular chamber and the internal passage of the rotatable member,

d. spring-loaded radial face-type sealing means accommodated within the annular chamber for sealing gaps between the casing end walls and sleeve,

e. a normally-open centrifugal valve in one of the ports and closable at a predetermined rate of rotation of the rotatable member, and

f. a normally-closed check valve in the other port for releasing fluid pressure from the chamber when the centrifugal valve is closed.

3,874,679

SEALING DEVICE

Sigurd Kaller, Vadursgaten 2A, S-582 45 Linkoping, Sweden

Filed Nov. 1, 1973, Ser. No. 411,879

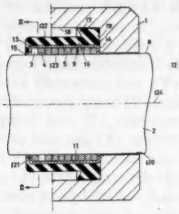
Claims priority, application Sweden, Nov. 3, 1972, 14281/72; June 12, 1973, 7308258

Int. Cl. F16j *15/18*

U.S. Cl. 277—37 **5 Claims**

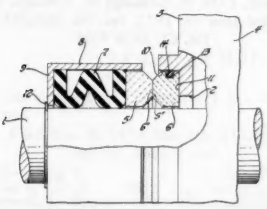
1. A sealing device which is applied between two elements (**1, 2**), movable in relation to each other, and intended to prevent leakage of high pressure medium between a high pressure side and a low pressure side, the device includes a ring assembly having a plurality of circular sealing rings engaging a surface (**8**) of revolution of at least the one element (**2**), the rings (**3, 4, 5**) being pressed against each other by a compression source, and having an open slit (**6**) to provide flexibility in said ring relative to said surface, whereon the slits (**6**) in the sealing rings are angularly displaced in relation to each other, and a sleeve (**16**) of resilient material tightly surrounding the sealing rings (**3, 4, 5**) and pressing radially against the sealing rings (**3, 4, 5**) under the influence of compressive forces, characterized in that at least the outer sealing ring in

the ring assembly is adapted to be acted on by the high pressure medium in a direction towards the remaining sealing



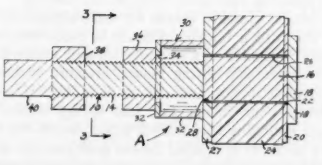
rings, and that the radial compression forces acting on the sleeve are brought about by the said high pressure medium.

3,874,680
SEAL RING AND BEARING ASSEMBLY
David L. Mustoe, Wheatridge, Colo.; Frederic D. Selbie, III, Signal Mountain, Tenn., and Michael J. Fenerty, Boulder, Colo., assignors to Coors Porcelain Company, Golden, Colo.
Filed Aug. 23, 1973, Ser. No. 390,809
Int. Cl. F16j *15/34*
U.S. Cl. 277—96 **12 Claims**



1. A seal assembly comprising two ring members having radially extending surfaces in sliding contact with each other, both of said surfaces having a hardness on the Mohs scale of at least about 7 and at least one of said surfaces being of magnesia-alumina spinel.

3,874,681
INTERNAL PIPE CLAMP
Robert Lanser, Rt. 1 Box 203, Iron, Minn. 55751
Filed May 24, 1973, Ser. No. 363,508
Int. Cl. B23b *31/40*
U.S. Cl. 279—2 R **4 Claims**



1. An internal pipe clamp comprising:

a. a shaft having threads along one portion thereof and having a second portion adjacent thereto,

b. a stop plate secured to the free end of said second portion of said shaft,

c. an annular compressible member increasing in diameter under compression being received on said second portion of said shaft and one end thereof abutting said stop plate,

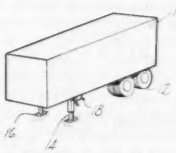
d. means supporting said compressible member on said second portion of said shaft against rotation thereon,

e. a pressure member positioned on said shaft adjacent the other end of said compressible member and being axially movable on said shaft into engagement with the compressible member,

f. means threadingly supported on the threaded portion of said shaft and movable therealong to urge said pressure member against said compressible member to increase the diameter thereof,

g. the diameter of said compressible member, at least in the compressed condition, extending radially beyond said pressure member and said stop plate, whereby said second portion of said shaft can be received in the end of a pipe and the last mentioned means threaded along said shaft to expand the compressible member into frictional engagement with the pipe.

3,874,682
LOAD LEVELING SYSTEM
Thomas B. Dalton, Muskegon, Mich., assignor to Westran Corporation, Muskegon, Mich.
Filed May 4, 1973, Ser. No. 357,497
Int. Cl. B60b *9/12*
U.S. Cl. 280—6 H **3 Claims**



1. In a semi-trailer, a system for maintaining the trailer load bed horizontal during raising and lowering that end of the trailer carried by the tractor comprising:

at least a pair of hydraulic cylinders equally spaced from a vertical plane through and including the longitudinal axis of said semi-trailer and suitably disposed to raise and lower said semi-trailer;

a source of pressurized fluid for operating said cylinders;

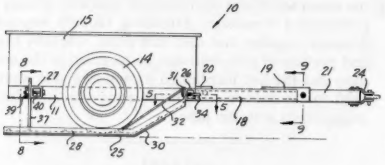
a valve for controlling the operation of said cylinders,

said valve comprising a housing formed with a bore therethrough and with two transverse bores intersecting said through bore equidistant from but on opposite sides of a plane through and parallel to the axis of elongation of said through bore and communicating with said hydraulic cylinders and with a transverse intersecting bore along said plane communicating with said source of pressurized fluid;

said valve further comprising a shaft rotatably mounted within said through bore on which is formed a flat registering with said third transverse bore and in which are formed two transverse bores extending from said flat through said shaft; means for axially retaining said shaft in said through bore; means for sealing said through bore and means exterior of said housing to rotate said shaft between a position in which said flat registers with said transverse intersecting bore and said transverse bores in said shaft respectively equally register with said transverse bores in said housing and positions in which registration between said transverse bores in said shaft and in said housing are not in equal registration whereby the rate of operation of said cylinders is equal in said first men-

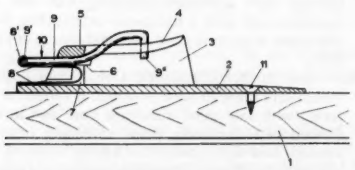
tioned position of said shaft and the rate of operation of said cylinders is equal in said first mentioned position of said shaft and the rate of operation of one of the cylinders is inversely proportional to the rate of operation of the other cylinder at other positions of said shaft.

3,874,683
SNOWMOBILE TRAILER
Clarence E. Lawson, 343 Quadra Ave., Rio Linda, Calif. 95673
Filed Sept. 12, 1972, Ser. No. 288,398
Int. Cl. B62b *13/18*
U.S. Cl. 280—10 **2 Claims**



1. In a snowmobile trailer, a frame, an axle extending transversely of said frame and secured thereto, for supporting said, a trailer body secured to said frame, a pair of wheels journalled on opposite ends of said axle, sub-frame members arranged in parallel relation laterally of the frame, a pair of combined channel shaped fender and runners positioned on each side of the trailer between said sub-frame members, said channel shaped members each including a generally horizontal portion and a sloping portion that is arranged angularly with respect to said horizontal portion, an upright plate element secured to the front end of the fender and runners, braces secured to said plate element and to the horizontal portion, said plate element being pivotally connected to an adjacent sub-frame member by means of a pivot bolt, a spring pressed latch pin extending through the last named sub-frame member for selectively engaging one of a plurality of bores, a plate member secured to the horizontal portion of the combined fender and runner and said plate member being arranged in spaced parallel relation to said plate element, said plate member having a slot therein, and a securing element extending through said slot and through an adjacent sub-frame member.

3,874,684
SKI TOE BINDING
Sven Ivar Dysthe, 1 Gml. Rykkinnv. 38, 1300 Sandvika, Norway
Filed Apr. 3, 1973, Ser. No. 347,578
Int. Cl. A63c *9/10*
U.S. Cl. 280—11.35 B **11 Claims**



1. A ski binding comprising:

a base portion (**2**) having a pair of side boot-engaging members (**3**) upwardly extending therefrom and being adapted to engage the forward or toe-end of a ski boot, said side boot-engaging members (e) each having portions which inwardly extend toward the boot, said inwardly extending portions having a generally downwardly extending hole (**4'**) with a generally downwardly extending axis formed therein;

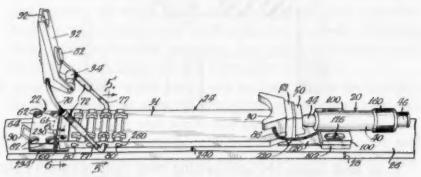
a crossbridge (**5**) extending inwardly from the forward ends of said side boot-engaging members (**3**);

means (**6**) on the forward portions of said side boot-engaging members (**3**) and spaced below said crossbridge (**5**) for defining a pivot or tilting point;

a flexible, generally U-shaped clamp member (**9**) having a middle portion (**9'**) and rearwardly extending branches, said clamp member (**9**) being mounted between said side boot-engaging members (**3**) and being interposed between said crossbridge (**5**) and said pivot point defining means (**6**) with said middle portion (**9'**) located in front of said pivot point defining means (**6**) and the branches extending rearwardly of said pivot point defining means (**6**), the ends (**9''**) of said branches being bent down toward the base portion (**2**) and adapted to be received in respective downwardly extending holes (**4'**) of said side boot-engaging members (**3**); and

means for biassing said middle portion (**9'**) of said clamp member (**9**) in the upward direction, thereby biassing said clamp ends (**9''**) downwardly toward said base portion (**2**) and through said downwardly extending holes (**4'**), said downwardly biassed clamp ends (**9''**) being adapted to bear on the sole of a boot through said holes (**4'**) to secure a boot in inserted position between said side boot-engaging members (**3**).

3,874,685
SKI BINDING APPARATUS AND METHOD OF MOUNTING
Kurt von Besser, 2734 W. Giddings St., Chicago, Ill. 60625
Filed June 15, 1972, Ser. No. 263,295
Int. Cl. A63c *9/08*
U.S. Cl. 280—11.35 K **19 Claims**



1. A ski binding for releasably securing a ski boot to a ski, comprising:

lower plate means having an uppermost surface, a recessed shoulder surface, a lower mounting surface which abuts said ski, screw means engaging said shoulder surface for securing said lower plate means to said ski, internal lock means located between said upper and lower surfaces, an open channel extending through the lower plate means, safety loop means disposed in and external to said channel for retaining the ski binding to the ski boot when the release pressure is exceeded, said lower plate means further including extension means located in said channel for capturing said safety loop means therein,

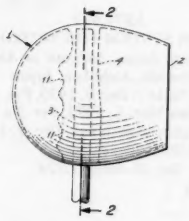
spring biased pressure means for securing said ski boot to the ski until a release pressure is exceeded, extending means engagable with said internal lock means to detachably secure said spring biased pressure means to said lower plate means, and

said lower plate means and said spring biased pressure means including longitudinal adjust means for establishing a plurality of spaced detent positions for said spring biased pressure means relative to said lower plate means, said extending means engaging said internal lock means to secure said spring biased pressure means to said lower plate means at any preselected one of said plurality of spaced detent positions.

3,874,686
SKI POLE HAND SHIELD AND METHOD OF MANUFACTURE

Donald R. Shipstad, North Hollywood, and Don Borden, Sherman Oaks, both of Calif., assignors to Hot Grips, Ltd., Sherman Oaks, Calif.

Filed May 25, 1973, Ser. No. 364,054
Int. Cl. A63c *11/22*
U.S. Cl. 280—11.37 H 3 Claims

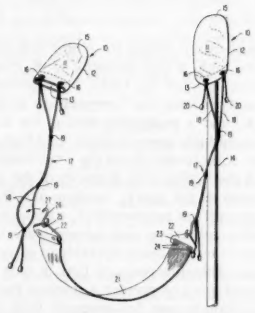


1. A ski pole hand shield, comprising:
a. an enclosure having an access opening and dimensioned to enclose a skier's hand;
b. a pair of hand grip elements within the enclosure disposed in coaxial relation, the grip elements having distal ends formed integrally with the enclosure, and proximal ends in confronting relation;
c. the hand grip elements forming jointly a socket penetrating a wall of the enclosure, for receiving an end of a ski pole.

3,874,687
SKI SEAT

Louise G. Cadwalader, 155 Montomery St., San Francisco, Calif. 94104

Filed Nov. 5, 1973, Ser. No. 412,545
Int. Cl. A63c *11/00*
U.S. Cl. 280—11.37 E 6 Claims

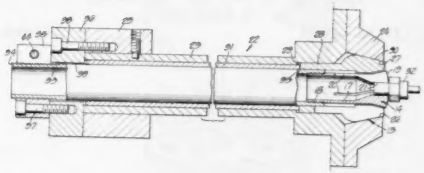


1. In a portable seat to be suspended between a pair of ski poles comprising a pair of caps to be placed over the handles of the respective ski poles, a pair of flexible suspension ropes, an elongated flexible seat band, means for attaching one end of each suspension rope to the lower portion of a respective cap, each of said ropes comprising at least two free strands knotted together at intervals sufficient to permit the shaft of a ski pole to pass between the two strands extending away from both sides of at least one of the knots, and connector means for securing the respective ends of said flexible seat band to a respective rope, said connector means including a projecting portion for insertion between the two strands of a suspension rope above one of said knots.

3,874,688
COLLET ADAPTER

Norman E. Schiller, 135 Eucalyplus Dr., El Segundo, Calif. 90245

Filed Apr. 4, 1974, Ser. No. 457,896
Int. Cl. B23b *31/20*
U.S. Cl. 279—50 6 Claims

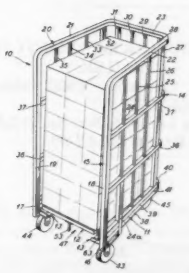


1. A machine tool collet chucking arrangement which maintains a workpiece at a predetermined location throughout securement therein, comprising:
a first tapered collet with springlike walls defining an opening therein rotatably mounted in said machine tool;
means for axially shifting said first collet against fixed parts of the machine tool to close said collet opening;
a second tapered collet with springlike walls defining a workpiece receiving opening, said second collet being removably received within the first collet opening; and
means securing said second collet to the machine tool whereby on closing said first collet opening about said second collet and included workpiece no axial movement thereof is produced.

3,874,689
NESTABLE CART

Lawrence M. Morgan, Anoka, Minn., assignor to The Cornelius Company, Minneapolis, Minn.

Filed Nov. 6, 1972, Ser. No. 303,932
Int. Cl. B62b *11/00, 3/02*
U.S. Cl. 280—33.99 H 13 Claims



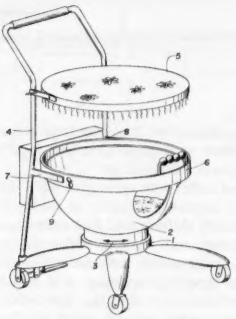
1. A nestable cart comprising:
a. a horizontal base of rigid U-shaped configuration, the legs of the U-shape diverging at the open end of the U-shape, and having a set of wheels secured thereto;
b. a shelf hinged to said base by hinge means at the closed end of the U-shape adjacent to said wheels and movable between an upright generally vertical position for nesting and a lowered generally horizontal position for use, said hinge means including hinge elements slotted for holding said shelf in said vertical position;
c. means acting between said base and said shelf for supporting said shelf in said lowered position; and
d. a vertically extending side structure having a rigid diverging U-shaped horizontal cross-sectional configuration

rigidly secured to and directly overlying said U-shaped base.

3,874,690
BABY STROLLER

Benny S. Marrone, Independence, Mo., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Aug. 28, 1973, Ser. No. 392,285
Int. Cl. B62b *7/00*
U.S. Cl. 280—47.39 **2 Claims**



1. A baby stroller having a wheeled base, said stroller comprising

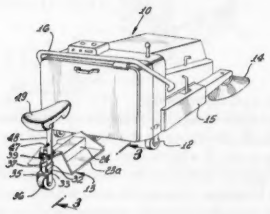
a baby seat rotatably mounted on the base for free rotation about its axis thereby enabling a baby therein to selectively rotate himself in the seat, the stroller having a frame affixed to the base and extending higher than the seat to facilitate pushing of the stroller and an awning mounted on the frame and extending over the seat at a distance therefrom; and

a ring around the baby seat in close proximity therewith but spaced therefrom and means stationarily affixing the ring to the frame in a manner whereby a baby in the seat may rotate himself by grasping the ring and pushing or pulling.

3,874,691
POWERED VEHICULAR IMPLEMENT STEERING TRAILER

Gregory J. Larsen, Claremont, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed June 14, 1975, Ser. No. 262,569
Int. Cl. B62d *1/00*
U.S. Cl. 280—87.1 **8 Claims**

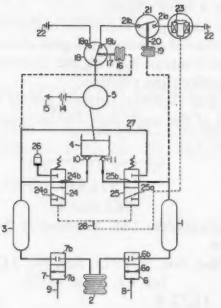


1. A trailer for attachment to a power driven wheeled vehicular implement said trailer comprising longitudinally extending drawbar means for connection to the implement, operator supporting means, a steerable wheel for supporting a rear portion of said drawbar means, and means for steering said wheel; the improvement wherein said operator supporting means comprises a foot treadle supported by said drawbar means for rocking motion of the treadle about a horizontal longitudinal axis by the operator, a rearwardly projecting treadle extension fixed to the treadle that rocks laterally with the treadle, and actuator means interconnecting said treadle extension and said trailer wheel for steering the wheel in response to rocking of said treadle, said treadle comprising a unitary member having a foot pedal on each side of said drawbar means.

3,874,692
AIR-SUSPENSION SYSTEM FOR MOTOR VEHICLES

Hiroyuki Ono, Kariya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya-shi, Aichi-ken, Japan

Division of Ser. No. 96,167, Dec. 8, 1970, Pat. No. 3,736,003.
This application Mar. 8, 1973, Ser. No. 339,345
Claims priority, application Japan, Dec. 9, 1969, 44-98333; Oct. 20, 1970, 45-92568
Int. Cl. B60g *11/26*
U.S. Cl. 280—124 F **2 Claims**



1. An air-suspension system for motor vehicles, comprising a low-pressure tank, a high-pressure tank, means providing communication between the tanks, a compressor for supplying compressed air from the low-pressure tank to the high-pressure tank, and a pneumatic means for communication with the low- and high-pressure tanks, said high-pressure tank supplying the compressed air to the pneumatic means as required, which then utilizes the elasticity of the compressed air confined therein as the energy medium and thereafter feeds the air back to said low pressure tank, a firstpressure-sensitive means operably related to said low-pressure tank, said first pressuresensitive means being operable in response to change in the pressure of the low-pressure tank in such a manner that the operation of said compressor is stopped thereby when the pressure reduction in said low-pressure tank reaches a prescribed level, a second pressure-sensitive means operably related to said high pressure tank and the compressor, said second pressure-sensitive means being operable in response to change in the pressure of said high-pressure tank in such manner that the operation of said compressor which has been stopped by said first pressure-sensitive means is restarted thereby when the pressure reduction in said high-pressure tank reaches a prescribed level, and means for air replenishment and becoming operative simultaneously with the operation of said second pressure-sensitive means thereby to change the communication of an inlet valve of said compressor over to an atmospheric air intake from said low-pressure tank and the communication of a discharge valve thereof over to said low-pressure tank from said high-pressure tank.

3,874,693
PROTECTIVE DEVICE, ESPECIALLY FOR THE PASSENGERS OF MOTOR VEHICLES

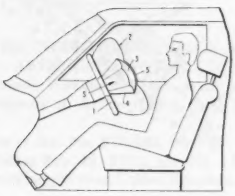
Helmut Patzelt, Fellbach; Gerhard Schiesterl, Etting, and Albert Seybold, Esslingen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany

Filed Oct. 24, 1972, Ser. No. 300,221

Claims priority, application Germany, Oct. 23, 1971, 2152902

Int. Cl. B60r *21/08*

U.S. Cl. 280—150 AB **5 Claims**



1. In a protective installation of the type including an air bag means a means for releasing gas into said air bag means, a gas deflection means arranged within said air bag means such that said air bag means is inflated into an approximately disk form having a major surface substantially perpendicular to the flow of gases released into said air bag means, and means for anchoring said air bag means to a mounting element, the improvement comprising connecting means for rigidly connecting at least a portion of said gas deflection means to the interior of said air bag means at said major surface such that said gas deflection means extends transversely to the gas flow, and holding means for holding said gas deflection means upon inflation of said air bag means at a predetermined distance from said means for anchoring said air bag means, said holding means being a plurality of ropes or cables, said ropes or cables holding said gas deflection means at a plurality of connection points of said gas deflection means, said plurality of connection points being laterally beyond said connecting means for rigidly connecting at least a portion of said gas deflection means to the interior of said air bag means.

3,874,694
UNITARY TONGUE INFLATOR FOR INFLATABLE RESTRAINT

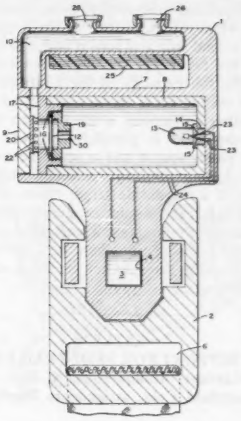
Robert L. Stephenson, Sterling Heights, Mich., assignor to Allied Chemical Corporation, New York, N.Y.

Filed Dec. 11, 1972, Ser. No. 314,046

Int. Cl. B60r *21/08, 21/10*

U.S. Cl. 280—150 AB **6 Claims**

1. A vehicle inflatable band assembly having a fastening device for positioning the band about an individual, comprising a rigid, unitary tongue attached to the inflatable band, a buckle for lockable engagement with said tongue, a chamber located in said tongue containing a source of pressurized gas in communication with the inflatable band, a rupturable partition separating said chamber from said band; a source of electrical energy for producing an electrical impulse; said source of pressurized gas including means responsive to the electrical impulse for rupturing the partition releasing the gas to the inflatable band, said tongue having electrical conductors connected to the means responsive to an electrical impulse, conductors on said buckle for contacting said tongue conductors when said tongue and buckle are in lockable engagement, said buckle conductors being in an electrical circuit including said source of electrical energy, and a sensing element for completing said electrical circuit in response to certain deceleration conditions of the vehicle whereby the safety band is inflated only when said tongue and buckle are



in lockable engagement and said sensing element has been actuated.

3,874,695
VEHICLE SAFETY DEVICE ACTUATION ARRANGEMENT

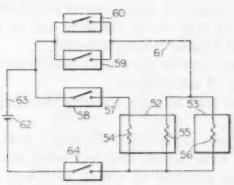
Fumiyuki Abe, Yokohama; Takashi Oka, Tokyo; Shigeo Fukuda, Fujisawa; Shunji Matsui, Yokohama; Kenzo Hirashima, Yokohama, and Akio Hosaka, Yokohama, all of Japan, assignors to Nissan Motor Company Limited, Yokohama City, Japan

Filed July 31, 1973, Ser. No. 384,170

Claims priority, application Japan, Aug. 1, 1972, 47-76516; Aug. 1, 1972, 47-89869; Jan. 10, 1973, 48-5286

Int. Cl. B60r *21/08*

U.S. Cl. 280—150 AB **12 Claims**



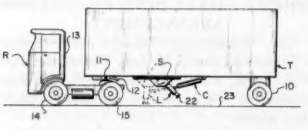
1. A vehicle safety arrangement which comprises at least one inflatable confinement to be expanded to a protective position in response to one of an impact exerted on the vehicle and a condition which is likely to lead to such an impact, first and second electrically-actuated, explosive-charged, gas-generating means each operative to direct gas under pressure into the at least one inflatable confinement when actuated, first and second switch means which are electrically connected in parallel to a power source and in series between said source and said first and second gas-generating means, respectively, and which are responsive to impacts of magnitudes above first and second predetermined levels, respectively, of which the former is lower than the latter, each of said first and second gas-generating means being actuated so as to direct the gas under pressure into the at least one inflatable confinement when the switch means connected therewith responds to an impact of a magnitude above the level which is predetermined therefor, and retarding means operatively connected with said second switch means and said second gas-generating means

for causing the second gas-generating means to be actuated at a retarded timing after the first gas-generating means has been actuated in response to the impact so that the inflatable confinement is expanded substantially immediately to part of its full capacity when the magnitude of the impact detected by the first and second switch means is above said first predetermined level and below the second predetermined level and stepwise to the full capacity of the confinement when said magnitude of the impact is above said second predetermined level and further comprising a third switch means which is electrically connected in parallel with said second switch means to the power source and in series between said source and the second gas-generating means and which is responsive to an impact of a magnitude larger thann a third predetermined level which is above said second predetermined level so that the inflatable confinement is expanded substantially immediately to its full capacity when the magnitude of the impact detected by the three switch means is above said third predetermined level.

3,874,696
SUPPORT FOR SEMI-TRAILERS

Clifford C. Gardner, Albuquerque, N. Mex., and Ralph A. Olson, Broomfield, Colo., assignors to Timpte, Inc., Denver, Colo.

Filed Jan. 2, 1973, Ser. No. 320,490
Int. Cl. B60s *9/04*
U.S. Cl. 280—150.5 **5 Claims**



1. A support for a semi-trailer adapted to be connected to and disconnected from a tractor, the front end of said trailer being supported by said tractor when connected thereto and said support supporting the front end of said trailer when said tractor is disconnected, said support comprising:

leg means for supporting the front end of said semi-trailer when said tractor is disconnected;

slide means movable forwardly and rearwardly along the underside of said trailer;

guide means for said slide means extending generally horizontally;

means pivotally connecting the upper portions of said legs with said slide means, said legs being movable between a depending position in which said legs are adapted to support said trailer through said slide means and a rearwardly extending position in which said legs are inclined rearwardly so as to be elevated; and

means for moving said leg means between said depending position and said rear position, said pivotal connection being constructed and arranged so that forward movement of said leg means will cause said leg means to move to said depending position and will also produce forward movement of said slide means, while rearward movement of said leg means will produce movement of said leg means to said rearwardly inclined position and also movement of said slide means to said rear position.

3,874,697
SHIELD FOR CONTROLLING ROAD SPRAY

James C. Thompson, 7605 Schaaf Dr., Richmond, Va. 23225

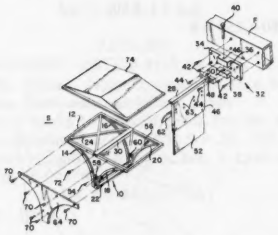
Filed May 2, 1973, Ser. No. 356,574
Int. Cl. B62d *25/16*
U.S. Cl. 280—154.5 R **12 Claims**

8. In combination with a vehicle having a frame and at least one set of tandem wheels including a front wheel and a rear wheel, a shield for controlling road spray comprising:

a. support means having an inboard and an outboard side,

b. said support means being secured on its inboard side to said vehicle frame and including a portion above the wheels of said set,

c. a vertical separator plate secured to and depending from said portion,



d. said separator plate being positioned between said front and rear wheels,

e. a downwardly extending director plate secured to said separator plate,

f. said director plate extending from said separator plate toward said front wheel,

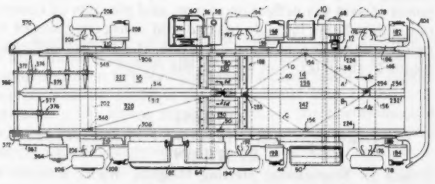
g. cover means on the outboard side of said support means for preventing discharge of lateral spray, and

h. a cover member secured to said portion.

3,874,698
ARTICULATED HAULAGE VEHICLE

Arthur L. Lee, and Arthur B. Coval, both of Columbus, Ohio, assignors to FMC Corporation, Chicago, Ill.

Filed Apr. 4, 1973, Ser. No. 347,646
Int. Cl. B60d *1/00*
U.S. Cl. 280—408 **6 Claims**



1. An articulated haulage vehicle comprising,

a frame member having a front section and a rear section, each of said sections having a front portion and a rear portion,

means connecting said frame member front section to said frame member rear section to permit articulation therebetween,

said means connecting said frame member front section to said frame member rear section includes universal connecting means to permit articulation between said frame sections in a plurality of different planes,

a pair of rear wheels mounted on opposite sides of said frame member rear section adjacent the rear portion of said frame member rear section,

a pair of intermediate wheels mounted on opposite sides of said frame member rear section adjacent the front portion of said rear section,

a pair of front wheels mounted on opposite sides of said frame member front section adjacent the front end portion of said frame member front section,

a body member having a longitudinally extending haulage compartment therein, said body member mounted on said frame member rear section,

a boom member having a longitudinal haulage compartment therein, said boom member mounted on said frame member front section, and

flexible means connecting said boom member to said body member to permit articulation therebetween and forming an elongated longitudinal haulage compartment,

said flexible means connecting said boom member to said body member includes means to permit articulation between said body member and boom member in a plurality of different planes.

3,874,699

DEVICES FOR INHIBITING THE JACK-KNIFING OR ARTICULATED VEHICLES

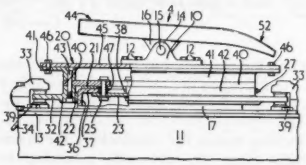
Philip Hayes, and William O'Leary, both of Innishannon, Ireland, assignors to Artiloc U.S.A. Inc., San Francisco, Calif.

Continuation of Ser. No. 878,691, Nov. 21, 1969. This application Feb. 10, 1972, Ser. No. 225,325

Claims priority, application United Kingdom, Nov. 23, 1968, 55650/68

Int. Cl. B62d *53/10*

U.S. Cl. 280—432 **9 Claims**



1. An anti jack-knifing device coupling a wheeled vehicle to tow an articulated trailer, comprising a support means secured to the rear of the vehicle, a turntable supported from said support means for rotation about a substantially vertical axis intersecting the longitudinal center line of the vehicle, a releasable coupling means secured to the turntable for rotation therewith, said releasable coupling means being connected to the trailer whereby articulation of the trailer will cause corresponding rotation of the turntable about its said vertical axis, wherein the improvement comprises an annular brake surface defined by said turntable, said annular brake surface lying wholly in a plane normal to said vertical axis, and brake means operable to engage said annular brake surface to inhibit rotation of the turntable during deceleration of the vehicle, said releasable coupling means comprising a fifth wheel coupling, a vertically-directed king pin carried by the front underside of the trailer for engagement by the fifth wheel coupling, and locking means for interengaging the trailer and the fifth wheel coupling whenever the articulation of the trailer exceeds a very small angle in either direction, whereby the trailer is allowed very limited articulation about its king pin and greater angles of articulation can only take place about said vertical turntable axis.

3,874,700

TOY VEHICLE CONSTRUCTION

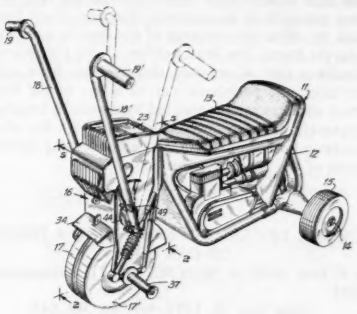
Raymond J. Lohr; Calvin S. Cook; Paul G. Goodwin, and Carl J. Merl, all of Erie, Pa., assignors to Louis Marx Co., Inc., New York, N.Y.

Filed Mar. 29, 1072, Ser. No. 239,156

Int. Cl. B62m *1/14*

U.S. Cl. 280—240 **7 Claims**

1. A drive mechanism for a toy vehicle comprising a housing, an axle supported by said housing, a pinion mounted on said axle, two wheels having surfaces lying in planes transverse to the longitudinal axis of said axle and mounted to said axle in side-by-side coaxial relationship and rotatable on said axle and defining an axis of rotation, an internal gear formed on each said wheel, the internal gear formed on one of the planar surfaces of said wheels facing the internal gear formed on the planar surface of the other of said wheels with the teeth thereof lying on an annulus spaced from said axis of rotation



and lying in a plane transverse to said axis, one-way drive means carried by said pinion and engaging said internal gears for driving said wheels in a single direction in response to reciprocal rotation of said pinion, a rack carrying member pivoted on said housing with the rack in meshing engagement with said pinion, and lever means connected to said member and extending outwardly of said housing for reciprocating said member through an externally applied force.

3,874,701

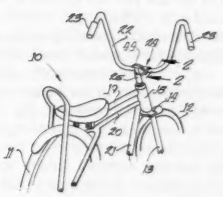
HANDLEBAR FASTENING DEVICE FOR A TWO-WHEEL BICYCLE

William E. Soong, 18 W. 282 71st St., Westmont, Ill. 60559

Filed Dec. 6, 1973, Ser. No. 422,557

Int. Cl. B62k *21/24*

U.S. Cl. 280—278 **4 Claims**



1. A device for detachably attaching a handle bar to the frame of a two-wheel bicycle having a front wheel and a back wheel, the front wheel journaled about its axis to a fork terminating at its top end in a post, a hollow tubular stem mounted on the bicycle frame and adapted to rotatably receive the post in the bottom end thereof, a bracket adapted to be secured at one point to the midpoint of the handle bars with a portion of the bracket defining a cylindrical stem adapted to project inwardly of the hollow tubular frame stem and engage the post, a wedging member having a base with a cylindrical threaded bore therein and having a wedging leg projecting upwardly therefrom adapted to wedgingly engage the bottom portion of the cylindrical leg, the cylindrical stem having a bore extending axially therethrough and disposed in alignment with the threaded cylindrical bore of the wedging member, the fastening device comprising:

a bolt member having an enlarged head portion, a collar member depending from the head portion, and a shank

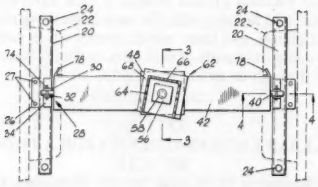
depending from the collar member, threads disposed about the circumference of the shank adjacent the terminal end portion and adapted to threadedly engage the threads in the threaded cylindrical bore of the wedge member, and the head portion adapted to be grasped in the hand of an individual in a manner to effect a rotating force thereon in a first direction about the shank axis to effect the threaded engagement of the threaded cylindrical bore to fasten the handle bars to the bicycle frame, and rotatable in an opposite direction about the shank axis to effect the removal of the handle bars from the bicycle frame, the head portion of the bolt member includes a pair of opposed semi-circular front and back surfaces, the peripheral curved edges of the front and back surfaces interconnected by a smooth longitudinally arcuately concave curved surface, and a flat elongated rectangular bottom surface interconnecting the end portions of the curved top surface.

3,874,702

HITCH FOR TRAILERS OVERHANGING A TRUCK BED OR CAR BODY

Percy P. Hall, 4103 W. Main St., Apt. 21, Kalamazoo, Mich. 49007

Filed Nov. 13, 1972, Ser. No. 306,042
Int. Cl. B62d *53/06*
U.S. Cl. 280—423 R **10 Claims**



1. A trailer having the lower portion of its front end raised above the level of its rear portion to overlie the rear end of a towing vehicle and side walls on said vehicle,

a central post secured in depending relation to the underside of said raised front end of said trailer,

a transverse support bar permanently and swivelly connected at its mid-section to the bottom of said post,

a means forming horizontal pivots on the ends of said support bar and in longitudinally extending relation thereto, said pivot means being adapted to be removably received by coacting bearing support means secured in transversely spaced relation to the rear of said vehicle.

3,874,703

ROLL TRAILER HITCHING APPARATUS

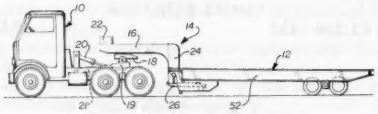
Douglas Ross, Bellevue; Hans H. Herrmann, and Harley Robert Renschler, both of Seattle, all of Wash., assignors to CTEC Corporation, Bellevue, Wash.

Filed July 22, 1974, Ser. No. 490,248
Int. Cl. B62d *53/06*
U.S. Cl. 280—425 R **6 Claims**

1. In an apparatus for coupling a powered vehicle to a wheeled trailer, a fifth wheel on the vehicle, means for elevating and lowering the fifth wheel relative to the vehicle, a connector including a forwardly extending arm pivotally coupled to the fifth wheel and a rearwardly extending arm, the rearwardly extending arm having upper and lower surfaces, the trailer having a forward end and a rearward end, the trailer having means for supporting the forward end above the surface on which the trailer rests, the trailer having a receptacle located on the forward end thereof, the receptacle having a fore and aft longitudinal dimension, a forward end, a rearward end, and a forwardly opening mouth through which the rearwardly extending arm of the connector can be inserted to engage the receptacle, the receptacle having means adjacent the rearward end thereof for engaging the lower surface of the rearwardly extending arm when the rearwardly extending arm is in a fully inserted position in the receptacle and when the connector is elevated relative to the vehicle, the receptacle having means adjacent the forward end thereof for engaging the upper surface of the rearwardly extending arm when the rearwardly extending arm is in a fully inserted position in the receptacle and when the connector is elevated relative to the vehicle, the forward end of said trailer thereby capable of being elevated relative to the surface on which it rests when the connector is elevated relative to the vehicle, the improvement comprising:

beam means fixed to the trailer, the beam means positioned transversely across the forward, upper portion of the receptacle, the beam means having a rearwardly facing surface,

first locking means mounted on the connector and on the trailer and being mutually engageable to interlock the



trailer and the connector as the latter is elevated relative to the vehicle when the rearwardly extending arm of the connector is in the fully inserted position in the receptacle, and

second locking means for interlocking the connector and the trailer when the rearwardly extending arm of the connector is inserted in the receptacle to an extent less than the fully inserted position, the second locking means including a member affixed to and extending upwardly from the upper surface of the rearwardly extending arm of the connector, the member capable of engaging the rearwardly facing surface of the beam means as the rearwardly extending arm of the connector is being withdrawn in a forward direction from the receptacle when the connector is elevated relative to the vehicle, thereby preventing further withdrawal of the rearwardly extending arm from the receptacle, the member being sized such that the member is capable of disengaging from the rearwardly facing surface of the beam means as the connector is lowered relative to the vehicle to allow the rearwardly extending arm to be withdrawn in a forward direction from the receptacle to uncouple the connectors from the trailer.

3,874,704

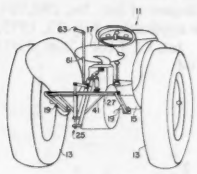
TRAILER HITCH

Thomas C. Williams, 7740 W. Whitecrane Rd., Atwater, Calif. 95301

Filed Jan. 10, 1974, Ser. No. 432,397
Int. Cl. B60d *1/00*
U.S. Cl. 280—479 R **2 Claims**

1. A trailer hitch for attachment to a three point hitch on a tractor and operable from the operator's seat on the tractor for coupling a trailer thereto and releasing the coupling, said trailer hitch comprising a frame adapted to be vertically moveable with the three point hitch, a pin carried by said frame and movable between an extended position for engagement with the trailer and a retracted position, means coupled between said frame and said pin for resiliently urging the pin into said extended position and a crank pivoted on said frame, said crank including a first arm having one end connected to said

pin and a second arm extending upwardly and joined at its lower end to the other end of the first arm, said second arm



being adapted to be reached by an operator in the seat of the tractor.

3,874,705

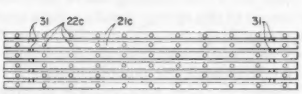
APPARATUS FOR BINDING SHEETS AND PRODUCT

William H. Abildgaard, Los Altos Hills, and Charles T. Groswith, III, Los Altos, both of Calif., assignors to Velo-Bind, Inc., Sunnyvale, Calif.

Division of Ser. No. 872,134, Oct. 29, 1969, , which is a continuation-in-part of Ser. No. 799,045, Feb. 13, 1969, Pat. No. 3,596,929. This application Feb. 9, 1973, Ser. No. 331,293

Int. Cl. B24d *1/00*; **B42d** *3/00*

U.S. Cl. 281—21 **9 Claims**



1. In combination for use in binding books, a plurality of first strips each having a plurality of studs projecting from one surface thereof, said studs spaced apart in intervals, a plurality of second strips of substantially the same length as said first strips formed with apertures spaced apart the same intervals as said studs, said apertures dimensioned to receive said studs when said studs are pushed through said apertures, each plurality of said strips being arranged in juxtaposition and which further comprises thin, discardable frangible members of plastic gate-like material to form a cartridge of strips joining adjacent strips.

3,874,706

FLUID ACTUATED PIPE CONNECTION

James Flinnoy Arnold, Houston, Tex., assignor to Hydrotech International, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 189,686, Oct. 15, 1971, abandoned. This application Sept. 28, 1972, Ser. No. 290,953

Int. Cl. F16l *35/00*

U.S. Cl. 285—24 **4 Claims**

1. In apparatus for connecting the ends of two pipes or the like, the combination comprising:

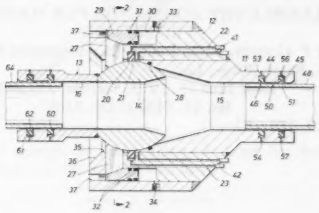
a pair of coupling members, each of which is adapted for connection at one end thereof to the end of one of said pipes;

with one of said coupling members having attached to the other end thereof an annular radially outwardly enlarged portion having axially forward and rearward sides;

a housing attached to the other end of said other coupling member, said housing being arranged to receive the forward side of said enlarged portion in generally mating engagement therewith;

a plurality of cam members supported by said housing initially in a radially retracted position, whereby said enlarged portion can be freely mated with said housing, and said cam members being arranged for generally radially inward movement into positive camming and locking engagement with the rearward side of said enlarged portion;

means for urging said cam members radially inward, including means for applying pressurized fluid to said housing to produce a force to actuate said cam members radially inward into engagement with the rearward side of said enlarged portion, with said force being sufficient in amount to cause said cam members to urge said enlarged portion into continual positive contact with said housing, whereby said enlarged portion and said housing are held against relative longitudinal movement therebetween;



an annular seal interposed between one side of said enlarged portion and said housing for providing a fluid seal therebetween;

and conduit means provided in said housing for applying pressurized fluid to said seal to urge said seal into sealing engagement between said enlarged portion and said housing;

another annular seal interposed between the other side of said enlarged portion and said housing, said other seal being generally axially spaced from said first seal and forming an annular testing chamber therebetween;

and another conduit means provided in said housing and communicating with said annular chamber between said enlarged portion and said housing and between said seals for testing said seals.

3,874,707

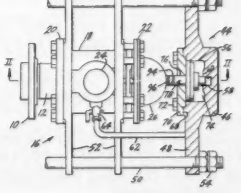
SELF-ADJUSTING SEAL LOAD COMPENSATOR

Donald L. Calkins, Three Rivers, Mich., assignor to The Johnson Corporation, St. Joseph, Mich.

Filed Feb. 5, 1973, Ser. No. 329,707

Int. Cl. F16l *17/00*, *33/16*

U.S. Cl. 285—93 **6 Claims**



1. A self-defined self-adjusting seal load compensator for pressurized rotary fluid joints comprising, in combination, a supporting housing, means supporting said housing for mounting adjacent a rotary fluid joint, a chamber defined within said housing having a cylindrical wall and an axis, a piston freely slidably mounted within said chamber having a periphery, an outer side remote from the fluid joint, and an inner side disposed toward the fluid joint, said piston periphery sealingly

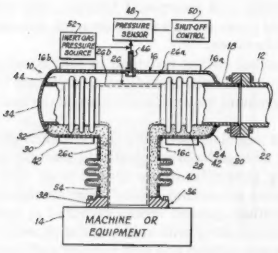
engaging said chamber, a piston rod mounted on said piston and slidably extending through said housing for engagement with a rotary fluid joint, said piston rod including an outer end and an adjacent outer end region extending from said housing for engaging the associated rotary fluid joint and being exteriorly visible, indicating means mounted on said piston outer end region indicating the axial position of said piston within said chamber, and a pressurized medium inlet port communicating with said chamber and said piston outer side and communicating with the fluid pressure supplied to the associated rotary joint.

3,874,708

FLEXIBLE PIPE CONNECTOR FOR MACHINERY PROTECTION

Glenn F. Gresens, Baton Rouge, La., assignor to H. E. Wiese, Inc., Baton Rouge, La.

Filed June 25, 1973, Ser. No. 373,372
Int. Cl. F16l *35/00, 51/02*
U.S. Cl. 285—93 **10 Claims**



1. A flexible connecting device for use between a pipeline and a machine or equipment,

comprising a casing having first and second diametrically opposite portions and a third portion extending transversely to said first and second portions,

a pipeline connecting pipe section extending into said first portion of said casing,

means forming a substantially rigid sealed joint between said pipeline connecting pipe and said first portion of said casing,

a blind pipe section connected with another substantially rigid sealed joint to said second portion of said casing and disposed therein,

conduit means disposed within said casing and having first and second diametrically opposite conduit sections and a third conduit section extending transversely to said first and second conduit sections,

a first flexible bellows connected between said pipeline connecting pipe section and said first conduit section,

a second flexible bellows connected between said blind pipe section and said second conduit section,

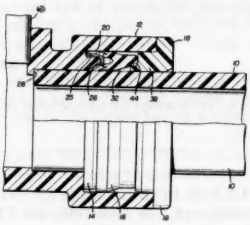
an equipment-connecting section secured to said third conduit section with another substantially rigid sealed joint, and a third flexible bellows connected at opposite ends to said equipment-connecting section and to said third portion of said casing.

3,874,709

TUBING FITTING

Robert D. MacDonald, Metamora, Mich., assignor to Cardinal of Adrian, Inc., Dryden, Mich.

Continuation-in-part of Ser. No. 290,194, Sept. 18, 1972, abandoned. This application July 23, 1973, Ser. No. 381,844
Int. Cl. F16l *17/00, 33/16*
U.S. Cl. 285—104 **5 Claims**



1. An improved pre-assembled sleeve type conduit coupling of the type wherein a conduit is coupled merely by stabbing it into the open end of the coupling sleeve bore, comprising:

a grab ring formed of thin springy metal having a smooth outer edge and a conical flange converging radially inwardly toward the coupling bore and axially inwardly away from the open end of the coupling bore, the innermost edge of the flange defining a conduit receiving bore which is normally smaller than the outer diameter of the conduit but which resiliently yields upon insertion of the conduit and which is provided with non-helical conduit gripping means for engaging and gripping the conduit upon attempted withdrawl of the conduit from the coupling;

said grab ring and conduit being freely jointly rotatable relative to the coupling;

a resilient sealing ring having a bore for receiving the conduit and having a first sealing surface for yieldably engaging and sealing against the outer periphery of the conduit at a point axially outwardly of the conduit gripping means toward said open end of said coupling sleeve and a second sealing surface for yieldably engaging and sealing against the coupling bore;

and an annular cap pre-assembled to the coupling and having a shoulder for limiting axially outward movement of said sealing ring toward the open end of the coupling bore;

said grab ring and said sealing ring having abutting surfaces which cooperate upon attempted withdrawl of the conduit and during elevated fluid pressure within the coupling for axially compressing said sealing ring between said grab ring and said cap thereby increasing the radial sealing forces at said first and second sealing surfaces.

3,874,710

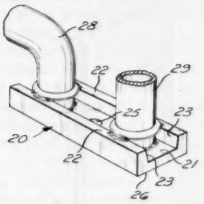
TUBING MANIFOLD COUPLING

Louis B. Courtot, Euclid, Ohio, assignor to The Weatherhead Company, Cleveland, Ohio

Filed Nov. 2, 1972, Ser. No. 303,242
Int. Cl. F16l *39/00*
U.S. Cl. 285—137 R **14 Claims**

1. A manifold coupling for mounting one or more tubes in fluid communication with a mating coupling member, comprising a C-shaped channel section having a thin web section extending between spaced side rails which project and diverge

from one face of said web section, at least one circular aperture through said web with opposed faces of said side rails



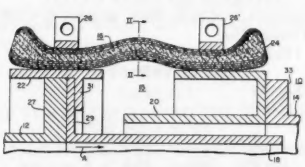
being substantially adjacent to said aperture, said aperture being partially formed in said faces.

3,874,711

GAS TURBINE EXHAUST SYSTEM EXPANSION JOINT

Augustine J. Scalzo, Philadelphia, Pa., and Chandrakant C. Shah, Ahmedabad, India, assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 6, 1974, Ser. No. 440,103
Int. Cl. F16l *21/00, 27/10, 51/02*
U.S. Cl. 285—236 **4 Claims**



1. An expansion joint for a gas turbine exhaust system comprising:

an exhaust duct for a gas turbine;

an exhaust gas stack for a gas turbine installation;

said exhaust duct from said gas turbine and said exhaust gas stack for said gas turbine installation having a junction therebetween permitting passage of exhaust gas therethrough;

a flexible sealing member disposed about said junction of the exhaust gas duct and the exhaust gas stack;

each edge of said flexible sealing member being secured to said exhaust gas duct and said exhaust gas stack by clamping members circumferentially disposed thereon;

said expansion joint also comprising an inner flow liner and an outer flow liner; and

said flexible sealing member including layers of fiberglass and layers of high temperature metal alloy reinforced asbestos.

3,874,712

CRIMP-ON CLAMP FOR FLEXIBLE DUCT

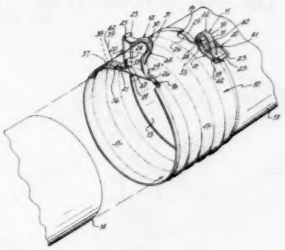
David G. Watson, Meadville, Pa., assignor to Eagle-Picher Industries, Inc., Cincinnati, Ohio

Filed Apr. 11, 1974, Ser. No. 460,074
Int. Cl. F16l *21/00*
U.S. Cl. 285—236 **10 Claims**

1. In a flexible ducting having a convoluted wire supporting a flexible material, a clamp at at least one end of said ducting, comprising,

an over-center toggle clamp,

a deformable receptacle secured to each end of said clamp, one receptacle receiving a free end of said convoluted wire,



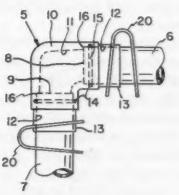
the other receptacle being clamped about the endmost convolution of the wire in said hose.

3,874,713

COUPLING APPARATUS FOR PIPES

Herman A. Myers, 112 N. Liberty, Masontown, Pa. 15461

Filed May 15, 1973, Ser. No. 360,571
Int. Cl. F16l *11/00*
U.S. Cl. 285—340 **6 Claims**



1. A coupling apparatus for joining lengths of fluid bearing pipes comprising:

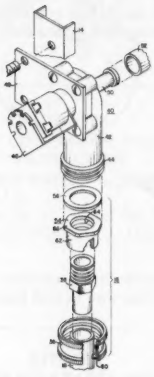
A. a coupling housing having a plurality of pipe receiving end portions and a bore extending therethrough communicating with the end portions, said end portions adapted to receive the pipes which are to be joined therewith, said housing also including a plurality of raised surface portions each located at a pipe receiving end thereof;

B. sealing means positioned within the pipe receiving bore portions of the coupling housing to sealably contact the outer circumference of the pipes to prevent fluid leakage around said pipes;

C. a plurality of rigid, washer members each having a pipe receiving bore therethrough and adapted to be placed adjacent a pipe receiving end of said coupling when said pipes are inserted into the coupling; and

D. means associated with the housing for forceably urging a portion of each washer toward the pipe receiving end of the housing whereby each raised surface portion of the housing acts as a fulcrum upon a surface of the washer causing the washer to biasly tilt relative to the longitudinal axis of the pipe so as to force the edge of the bore of the washer into gripping engagement with the outer periphery of the pipe to prevent longitudinal movement of said pipes relative to the coupling housing.

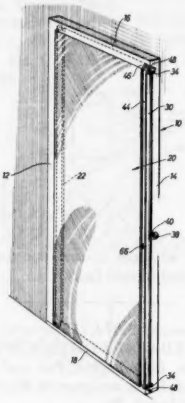
3,874,714
FITTING FOR WATER SUPPLY ARRANGEMENT
Jack E. Bebinger, Columbus, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Oct. 25, 1972, Ser. No. 300,617
Int. Cl. F16l *17/00*
U.S. Cl. 285—354 **5 Claims**



1. In a water supply system, the combination comprising:
a water supply inlet valve having a plastic valve body including an integral, plastic male supply inlet for said body; and a fitting for making a connection between said valve inlet and a water supply conduit having an exteriorly-threaded, male outlet end, said fitting including an adapter part and a coupling ring, said coupling ring being internally threaded and provided with an inwardly-directed flange at its inlet end,
said adapter part having a tubular body of lesser exterior diameter than the internal diameter of said inwardly-directed flange of said coupling ring, said tubular body being internally threaded at its inlet end adapting it thereby to be turned onto said supply conduit end, said adapter part having an outwardly-directed shoulder at its outlet end adapted to abut with said inwardly-directed flange of said coupling ring when said adapter part and coupling ring are assembled in generally coaxial relation with said adapter part generally projecting upstream relative to said coupling ring so that said adapter shoulder is concealed in the assembly, the periphery of said adapter shoulder being of non-circular outline to facilitate holding said adapter shoulder with a tool, and
a removable sealing washer adapted to be received in said coupling ring and abut the downstream face of said adapter shoulder.

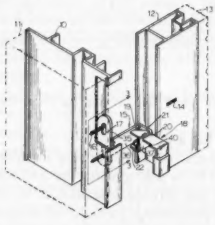
3,874,715
LOCKING DEVICE FOR DOORS
Emile Beudat, Stockholm, Sweden, assignor to Beauside Patentverwertungs A.G., Zurich, Switzerland
Filed June 5, 1973, Ser. No. 367,175
Claims priority, application Sweden, June 28, 1972, 8528/72
Int. Cl. E05c *19/02*
U.S. Cl. 292—75 **10 Claims**

1. A lock for a door which is hingeable in a door frame about an axle mounted in one side of the frame, comprising
two elongate members mounted in the opposite side of the door frame in parallelism to said axle, one of which is an operating member that is rotatable about an axis parallel to the axis of said axle, and the other of which is a locking member reciprocable in a direction transverse to said axes for movement from an open position, in which it is engaged with an elongate recess in said operating member that extends parallel to said axes, into a locking posi-



tion in engagement with an elongate recess in the free adjacent edge of the door that extends parallel to said axes, and vice versa.

3,874,716
INTERIOR SECURITY LATCH
Joseph C. Bancroft, McComb, Miss., assignor to Croft Metals, Inc., McComb, Miss.
Filed Oct. 23, 1973, Ser. No. 408,498
Int. Cl. E05c *1/04*
U.S. Cl. 292—175 **1 Claim**



1. A glass sliding door assembly comprising, in combination:
a. a glass door panel laterally movable from a closed secured position to an open entrance position and formed of extruded members including on the entrance end thereof an extruded vertical panel jamb to be secured, said panel jamb having a horizontally oriented rectangular-shaped slot formed therein and vertically positioned at a level suitable to service for locking;
b. a wall secured building frame slidably mounting said panel and formed of extruded members including an extruded vertical frame jamb positioned for securement to said panel jamb when in said closed position; and
c. a security latch mechanism for securing said panel jamb to said frame jamb when in said closed secured position, said mechanism comprising:
1. a latch bracket formed of a first elongated strip of thin sheet material, said bracket having at one end a flat mounting portion with plural apertures for receiving fastening means to secure such mounting portion to said frame jamb and having at an opposite end a U-shaped bolt support portion appended to said mounting portion, said bolt support portion having a central base and perpendicular thereto opposed sidewall portions with oppositely positioned rectangular-shaped slots for

receiving a latch bolt and with one of said sidewall portions forming a perpendicular continuation of said mounting portion, said bracket further having a spring support wall portion with a spring mounting aperture therein appended perpendicularly to said base portion and in a plane generally parallel to the disposition of said bolt slots;

2. a latch bolt formed of a second elongated strip of thin sheet material of rectangular cross section having a forward bolt portion slidably mounted in said bolt receiving slots for inward locking and outward unlocking positioning and having a rearward handle portion extending from and formed perpendicular to said bolt portion, said bolt portion having intermediate its length a spring mounting aperture opposite and mating said latch bracket wall spring mounting aperture, the forward locking end of said bolt portion being formed to engage said panel jamb slot to lock said frame jamb thereto; and

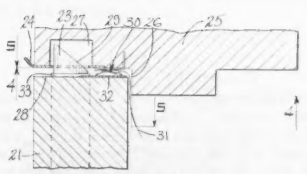
3. a compression spring mounted within said U-shaped configuration and formed as a leaf spring of a thin sheet strip having linear end portions and a central compressible, semi-circular portion, one linear end portion being pivotally mounted in said latch bolt mounting aperture and the opposite linear end portion being pivotally mounted in said spring support wall portion mounting aperture, said spring being mounted on said respective spring mounting apertures to provide a toggle effect such that when said latch bolt is moved inwardly, said compression spring pivots on said wall portion and tilts in the same direction to force said latch bolt towards a positive locking position and when said latch bolt is moved outwardly said compression spring pivots and tilts oppositely to force said latch bolt toward a positive unlocked position.

3,874,717

DEVICE FOR DISCOURAGING THE JIMMYING OF DOOR LOCKS

Robert E. Pratt, P.O. Box. 100, Somers, Conn. 06071

Filed Aug. 2, 1973, Ser. No. 384,986
Int. Cl. E05b *17/00*
U.S. Cl. 292—346 **6 Claims**



1. A device for use with a door lock, which lock includes a bolt in an end wall of said door, said device comprising:

a first plate-like member adapted for mounting on either the jamb or the end wall of said door; and

a second plate-like member angularly connected to said first member and having a vertical free edge, said second member being resiliently biasable toward said first member in response to contact with the other of said door jamb and said end wall when said door is swung to a closed position, said second plate-like member being curved in horizontal section to present a convex surface toward the first plate-like member;

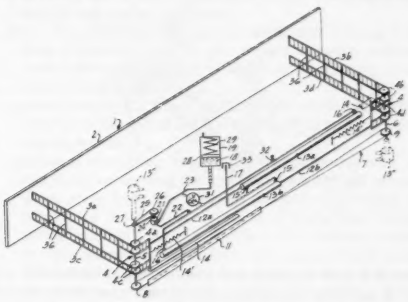
the portion of said second plate-like member adjacent said free edge lying at an angle to the first plate-like member greater than the angle between said members at their line of connection; whereby said device will block the clearance space between said door jamb and said end wall adjacent said bolt when said door is in said closed position, thereby preventing contact of a jimmying device with said bolt.

3,874,718

DECELERATING SAFETY BUMPER FOR VEHICLES AND THE LIKE

Tony Nagin, Jr., and Tony Nagin, Sr., both of 14016 S. Indiana, Riverdale, Ill. 60627

Filed Feb. 8, 1973, Ser. No. 330,616
Int. Cl. B60r *19/06;* **180** *91;93*
U.S. Cl. 293—85 **33 Claims**



1. A bumper structure, particularly for vehicles, comprising a bumper member adapted to receive impact loads applied thereto in a predetermined direction over a predetermined travel from a maximum extended position to a maximum retracted position, means for supporting said bumper member in operative position to receive such loads, including a plurality of elongated unitary members each of which, when extended in a straight line, is independently rigid under compression forces acting along such line, but capable of flexing in a direction transverse to such line, each such elongated member being operatively connected at one end to the bumper structure for receiving such impact loads and transmitting them along respective straight lines, each such member, when the bumper member is in extended position, spanning at least a portion of the distance between said extended and retracted position, means disposed adjacent the retracted position of said bumper member for guiding the opposite ends of said elongated members into transverse directions as the elongated members retract under compression forces resulting from such impact loads on the bumper member, with said opposite ends spaced rearwardly from the retracted position of the bumper member a distance less than that between said extended and retracted positions, and shock absorbing means operatively connected to said elongated members, whereby compression forces thereon are transmitted to said shock absorbing means.

3,874,719

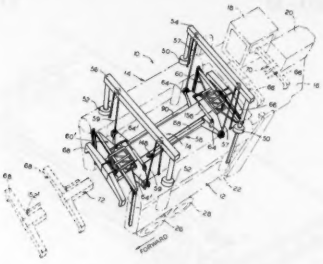
EXTENSIBLE LOAD LIFTING FRAME

Wynand M. J. M. Goyarts, 232 Chapel Hill Dr., Battle Creek, Mich. 49015, assignor to Clark Equipment Company, Buchanan, Mich.

Filed Nov. 20, 1972, Ser. No. 308,216
Int. Cl. B66c *1/00*
U.S. Cl. 294—81 SF **23 Claims**

1. A telescopic spreader frame for handling cargo containers of different lengths which have latch receiving receptacles in the upper corner portions thereof, comprising a hollow fixed outer center beam, a hollow intermediate beam telescoped in the center beam, a hollow inner beam telescoped in the intermediate beam, said beams being substantially coaxial, said intermediate and inner beams being extensible away from each other out of opposite ends of said center beam, an end beam secured adjacent the outer end of each of said intermediate and inner beams which extends laterally outwardly substantially equal distances in opposite directions from each of said intermediate and inner beams, latching means adjacent each end of each end beam for engaging the respective latch receiving receptacles of a cargo container, actuator means

connected to each of said intermediate and inner beams for selectively extending and retracting the latter beams to engage the latching means of the end beams with a cargo container of any of a plurality of selected lengths, said actuator means comprising oppositely extending hydraulic cylinder means each being connected at its one end to a side of the center



beam and at its opposite end to a respective lateral side portion of opposite ones of said end beams, transversely extending lifting beams mounted fixedly from opposite end portions of said fixed center beam, and lifting means connected to each lifting beam at opposite end portions thereof for elevating said spreader frame, said actuator cylinder means being located in the horizontal plane of said telescopic beams.

3,874,720

DEVICE FOR FISHING FROM A BOREHOLE AN ELONGATED MEMBER, SUCH AS A DRILL STRING

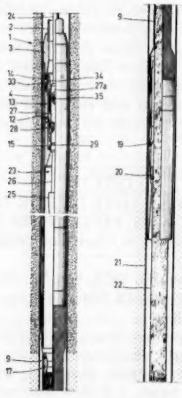
Remi Reynard, Montesson; Michel Chatard, Chatou; Yves Willm, Suresnes, and Pierre Grolet, Orgerus, all of France, assignors to Institut Francais Du Petrole, Des Carburants Et Lubrifiants,, Rueil-Malmaison, France

Filed July 26, 1972, Ser. No. 275,165

Claims priority, application France, July 30, 1971, 71.28182

Int. Cl. E21b *31/02*

U.S. Cl. 294—86.26 **15 Claims**



9. A device for withdrawing an elongated member from a borehole comprising: at least one upper tubular member; at least one lower tubular member; a sock-like means disposed between and attached to said upper and lower tubular members for constricting on the elongated member; at least one additional tubular member disposed between said upper and lower tubular members within said sock-like means, said additional tubular member constituting an inner lining for said sock-like member and having a diameter greater than that of the elongated member to be withdrawn from the borehole.

3,874,721

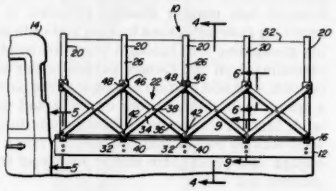
RETRACTABLE LOAD BED COVER

John D. Tuggle, Ryan, Okla., assignor to Tuggle Inc., Ryan, Okla.

Continuation-in-part of Ser. No. 217,919, Jan. 14, 1972, abandoned. This application May 11, 1973, Ser. No. 359,454

Int. Cl. B60j *7/24*

U.S. Cl. 296—105 **13 Claims**



1. A retractable cover adapted to be installed on the load bed of a land vehicle comprising:

a plurality of inverted U-shaped frames, each frame comprising a top portion and side portions depending from opposite ends of said top portion;

follower means at the lower ends of said side portions adapted to engage and to be guidingly supported from track means mounted on said vehicle;

means for interconnecting said frames for movement toward and away from each other; and

canopy means disposed within and attached to said frames along the inner surface thereof, said canopy means comprising a canopy adapted to be stretched within said frames when said cover is extended and to pleat and fold below said frames when said cover is collapsed.

3,874,722

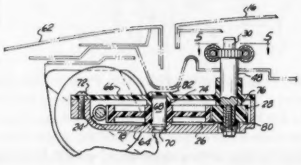
SUN ROOF GEAR BOX

Joseph Pickles, Birmingham, Mich., assignor to Ferro Manufacturing Corporation, Detroit, Mich.

Filed Mar. 20, 1973, Ser. No. 343,125

Int. Cl. B60j *7/04*

U.S. Cl. 296—137 G **4 Claims**



1. A drive assembly for a sliding sun top panel comprising a transmission housing comprising a flat housing member having a bottom wall and an upwardly open recess, a removable cover, a worm in said housing, a worm gear in mesh with said worm, a pinion in mesh with said worm gear, a drive shaft connected to said pinion to be driven thereby upon rotation of said worm and extending upwardly from said cover, and an output drive gear on said shaft outside said housing, said housing member having a permanently fixed stub shaft extending upwardly from said bottom wall, said worm gear being rotatably mounted on said stub shaft, said cover having a recess in which the upper end of said stub shaft is journaled, said bottom wall having a narrow bearing flange surrounding said stub shaft, said cover having a narrow flange surrounding said recess, said worm gear being rotatable on said stub shaft and stabilized by its engagement with both of said narrow bearing flanges, said cover having an opening therethrough

which receives the inner end of said drive shaft, an upwardly extending guide sleeve surrounding said opening and receiving said drive shaft, and a narrow bearing flange surrounding said opening at the underside of said cover, said housing member having an opening it its bottom wall aligned with the opening in said cover, a narrow bearing flange surrounding the opening in the bottom wall of said housing member, the portion of said drive shaft within said housing being reduced and providing a shoulder, said pinion being rotatable on the reduced portion of said drive shaft, and friction means coupling said pinion to said drive shaft.

3,874,723

OPEN ROOF STRUCTURE FOR A VEHICLE

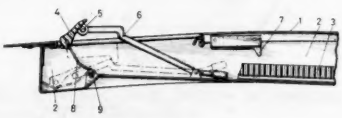
Willem Frans Coenen, Prinses Marielann, Wassenaar, Netherlands

Filed Sept. 25, 1973, Ser. No. 400,585

Claims priority, application Netherlands, July 16, 1973, 7309886

Int. Cl. B60j *7/22*

U.S. Cl. 296—137 J **2 Claims**



1. An open roof structure for a vehicle provided with a slidable roof panel and a wind breaker mounted at the front side of the roof opening, which wind breaker is connected with a lever which, on moving the panel in the closed position, is pressed downwardly by one or more than one cam affixed to the panel, whereby the wind breaker is received in the foremost portion of the water channel, characterized in that the connection between the wind breaker (**4**) and said lever (**6**) is a hinged connection and that the wind breaker (**4**) is also connected with a hinged connection with at least one arm (**8**) positioned in the water channel, which arm is adapted to rotate about a fixed point such that on pressing said lever (**6**) downwardly the wind breaker (**4**) is tilted from an upright position into a flat position.

3,874,724

RECLINING CHAIR

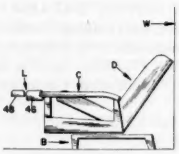
Frank Manuel Re, Holyoke, Mass., assignor to Dual Manufacturing and Engineering Incorporated, Holyoke, Mass.

Division of Ser. No. 222,563, Feb. 1, 1972, Pat. No. 3,758,151.

This application Nov. 16, 1972, Ser. No. 307,176. The portion of the term of this patent subsequent to Oct. 22, 1991, has been disclaimed.

Int. Cl. A47c *1/02*

U.S. Cl. 297—88 **5 Claims**



1. A reclining chair adapted to be positioned in close adjacency to and forwardly of a room wall when in the upright sitting position and yet so structured as to allow ready assumption of a reclined position without physical contact with the same room wall, the reclining chair comprising:

a base, a chassis supported relative to the base,

a body-supporting unit including a seat and a back having a pivotal relationship as to each other,

a leg-supporting unit, mounting means for mounting the body-supporting unit relative to the chassis in movements between upright and reclining positions,

means for mounting the chassis relative to the base in linear movements relative to the base as the body-supporting unit is concomitantly moved,

means for mounting the leg-supporting unit relative to the body-supporting unit in movements between retracted and extended positions as the body-supporting unit is concomitantly moved,

control means for controlling the pivotal motion of the back relative to the seat as the body-supporting unit is concomitantly moved,

and means operatively connecting the body-supporting unit and base for moving the chassis forwardly and progressively away from the wall and the body-supporting unit relative to the wall as transition is made from upright sitting position toward a position of reclination and for moving the chassis rearwardly and progressively toward the wall and the body-supporting unit relative to the wall as transition is made from a position of reclination toward upright sitting position.

3,874,725

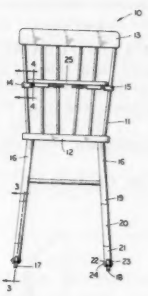
CONVERTIBLE ROCKING CHAIR

James T. Perry, Knightstown, Ind., assignor to Philip H. Willkie, Rushville, Ind., a part interest

Filed Aug. 16, 1973, Ser. No. 388,825

Int. Cl. A47c *1/08*

U.S. Cl. 297—133 **1 Claim**



1. A convertible chair comprising:

a main frame including a seat, back support and arms connected together with four legs depending therefrom;

a pair of spaced apart arcuate rockers each of which having a pair of holes extending therethrough; and,

leg extensions threadedly mounted to said four legs and extending therebeneath, said extensions each having a bifurcated bottom end forming a pair of spaced apart walls with a bearing pin mounted thereto, said rockers extend between said spaced apart walls with each bearing pin extending through one of said holes mounting said rockers to all of said extensions;

a tray removably mounted to said arms;

said arms have mutually opposed vertical surfaces with a slot in each of said surfaces;

said tray includes a pair of housings and a first pair of parallel pins slidably mounted within said housings, said tray further includes a second pair of housings and a second pair of parallel pins slidably mounted within said second pair of housings, each housing having a spring mounted therein forcing said first pair of pins into one of said arms

and said second pair of pins into the other of said arms, each of said pins normally projecting outwardly of the periphery of said tray, each pin having an outer circular distal end; and further comprising:

locking means on said arm and in each slot to engage said pins and lock said tray to said arm;

retracting means mounted to said tray and connected to said pins being operable to retract said pins and unlock said tray from said arms, said retracting means includes a first handle fixedly connected to said first pair of pins and slidably mounted to said tray and a second handle fixedly mounted to said second pair of pins and slidably mounted to said tray, said first handle and said second handle being movable together to retract said pins from said arms;

said locking means includes a pair of inserts each mounted in a slot in said arms, said inserts include a plurality of recesses to lockingly receive said pins, said recesses on one insert are mutually opposed and aligned with recesses of the other insert;

each of said extensions include a top rod and a bottom rod in line therewith and removably threaded together with said top rod removably threaded into a leg and said bottom rod connected to one of said rockers, said bottom rod of said extension is removable to convert said chair from a rocking chair to a high chair, said top rod of said extension is removable with said bottom rod of said extension to convert said chair from a high chair to a low chair;

said inserts have saw toothed configurations formed on mutually opposed surfaces of said arms, said saw toothed configurations each include a leading surface extending inwardly and rearwardly toward said back support and a rear vertical surface providing a stop surface which is arranged perpendicularly to said arms.

3,874,726

MOULDED CHAIRS

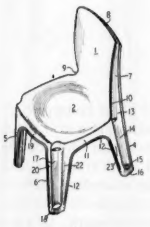
Harry Sebel, Bankstown, and Dillon Charles Furey, North Sydney, both of New South Wales, Australia, assignors to Sebel Limited, Bankstown, New South Wales, Australia

Filed Apr. 27, 1973, Ser. No. 355,210

Claims priority, application Australia, Sept. 28, 1972, 633/72

Int. Cl. A47c *3/00*

U.S. Cl. 297—239 **4 Claims**



1. A chair stackable and rowable with an alike chair, comprising a single body moulded from plastic material and defining a back support, a seat, rear legs and front legs; the rear and front legs having side edges which define lower parts of side planes of the chair and said edges and planes being substantially vertical to facilitate rowing of the chair with an alike chair; each year and front leg defining a channel which, in cross-section, is convex toward the inside of the chair, over an upper and at least a greater part of its length, for receiving a corresponding channel-like rear leg of an alike chair stacked thereon; the back support having contracted waist portions adjacent the seat and the rear legs, and the channel defined by the rear legs having top end portions merging into respective, contracted waist portions to facilitate stacking of the chair.

3,874,727

CHAIR

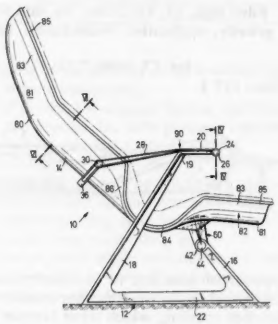
Klaus Mehbert, and Guenter Valenta, both of Stuttgart, Germany, assignors to Rudolph Baresel-Bofinger, Ilsfeld, Germany

Filed Mar. 13, 1973, Ser. No. 340,824

Claims priority, application Germany, May 10, 1972, 2222840

Int. Cl. A47c *1/033*

U.S. Cl. 297—320 **4 Claims**



1. A chair, especially an armchair, comprising a chair body including a rigid backrest portion, a rigid leg portion, and a flexible seat portion connecting said backrest portion and said leg portion so that said backrest portion and said leg portion are pivotable forward and backward about and with reference to said seat portion; and support means including rearward legs and supporting said chair body for continuous adjustment of the position of said portions relative to one another and to said support means, at the will of a user, said support means comprising connecting means between said chair body and said support means, in one area between said seat portion and said leg portion and in another area in that region of said back rest portion which is adjacent said seat portion, said connecting means in said other area comprising a strap extending in a direction substantially normal to a line intermediate said back rest and leg portion, two laterally disposed studs on said strap extending in a direction substantially normal to said line, and two arm rests, said arm rests connecting said rearward legs and said studs, respectively.

3,874,728

DENTAL PATIENTS CHAIR WITH A PARALLELOGRAM SUPPORTING ARM

Rolf-Jurgen Weiland, Lortzenbach/Furth, Germany, assignor to Siemens Aktiengesellschaft, Erlangen, Germany

Filed Oct. 17, 1973, Ser. No. 407,179

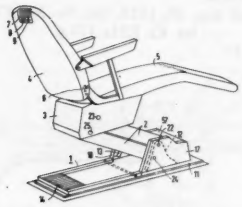
Claims priority, application Germany, Oct. 21, 1972, 2251808

Int. Cl. A47c *1/02, 1/06*

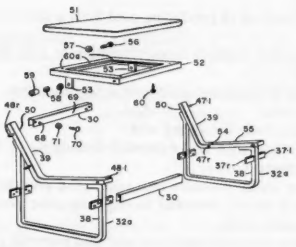
U.S. Cl. 297—330 **10 Claims**

1. A dental patients' chair, comprising a base, a seat, a parallelogram carrying arm having one end connected with said base and the other end carrying said seat, the ends of said arm having diagonally opposed axles, and a device for height shifting of the seat, said device comprising an electrically driven spindle drive engaging said arm between said axles, said spindle drive comprising a motor, a rotary spindle driven by

said motor, a bearing for the spindle connected with one of said axles and a screw nut engaging said spindle and connected with that end of the arm having the other one of said axles.

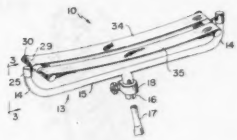


3,874,729
GROUP LOUNGE FURNITURE
Leif Blodee, Holland, Mich., assignor to American Seating Company, Grand Rapids, Mich.
Filed Dec. 4, 1973, Ser. No. 421,594
Int. Cl. A47c *4/02, 7/20*
U.S. Cl. 297—445 **6 Claims**



1. A chair comprising first and second side frames of tubular metal, each forming a front leg, a rearwardly extending brace at the top of said front leg, a floor-engaging runner at the bottom of said front leg, an upwardly extending rear leg, and a slightly rearwardly extending portion at the top of said rear leg; first and second connector frame members having a generally L-shape, each connected to an associated side frame at the brace and the upper portion of said rear leg thereof; an inwardly extending tab on each leg; first and second channel-shaped stretchers extending respectively between the tabs on the pair of front legs and the tabs on the pair of rear legs; a seat cushion extending betwen the generally horizontal portions of said connector members; and a back cushion extending between the generally upright portions of said connector members; each of said cushions comprising a metal pan having upwardly turned side portions; a body of foam filling said pan and extending above the upper edges of said sides thereof; a sheet of foam material encompassing said body and said pan; first and second strengthening plate members connected respectively to the upwardly turned sides of said pan; and fastener means for attaching the sides of said pan to an associated connector frame members through an associated strengthening plate.

3,874,730
BICYCLE SEAT
John L. Marchello, 9934 Daleview, South Lyon, Mich. 48178
Filed Dec. 12, 1973, Ser. No. 426,684
Int. Cl. A47c *7/02;* **B62j** *1/00*
U.S. Cl. 297—452 **6 Claims**



1. In a bicycle having a longitudinal axis extending generally from the front to the rear thereof, and a mounting attachment for a seat, wherein the improvement comprises an improved seat mounted on said attachment, comprising:

an elongated, U-shaped seat frame having a pair of generally parallel upwardly extending legs interconnected by an elongated base portion having a longitudinal axis generally perpendicular to the bicycle longitudinal axis;

an elongated, relatively narrow, flexible seating strip formed of a relatively stretch resistant material, extending between said legs above and generally longitudinally centered relative to said seat frame base to define a seat supporting surface extending generally perpendicular to the bicycle longitudinal axis to cradle a rider's hips or legs; and

fastening means securing the opposed ends of said seating strip to a respective seat frame leg, each of said fastening means being independently pivotally interconnected with respect to each respective seat frame leg about an axis generally perpendicular to the bicycle longitudinal axis for independent or simultaneous pivoting of said fastening means to enable pivotal twisting of the seating strip during pedaling or simultaneous pivoting to accomodate different rider positions, said fastening means including cross bar members supporting respective opposed ends of said seating strip, a pin attached to each of said legs, and a member supported by each of said pins and being releasably and swivelly interconnected with each respective cross bar.

3,874,731
INJECTION MOLDED SEATING
James A. Jordan, Rochester, Mich., assignor to Ford Motor Company, Dearborn, Mich.
Filed May 4, 1973, Ser. No. 357,309
Int. Cl. A47c *31/10;* **B60n** *1/02*
U.S. Cl. 297—452 **2 Claims**

1. A padded vehicle seating structure, comprising:

a. a rigid subframe having a substantially annular member at least at one side thereof, and having a flange continuously adjacent said annular member,

b. a preformed continuous composite cushion effective to be supported by said subframe and effective to surround substantially all sides of said subframe except for the space defined within said annular member, said composite cushion being comprised of a flexible abrasion resistant skin and a solid flexible foam substrate, each being bonded to the other, said skin having a continuous annular terminating portion adjacent one side of said annular member and having a continuous depending wall extending beyond said substrate for carrying said terminating portion, said solid foam substrate being defined with a continuous groove adjacent at least three sides of said substrate and said groove opening to said one side, said subframe having portions thereof adapted to extend into

and be received by said cushion groove for stabilizing same when mounted thereon, and

c. means defining a resilient ring integral with said terminating portion of said skin and effective to grip a continuous side of said annular member opposite from said member

one side, said ring means being effective to permit snap-tight mounting of said composite cushions on said subframe and having said skin arranged to permit transmission of tension forces throughout as received from said ring, said continuous depending wall being in engagement with said subframe flange adjacent said annular member.

3,874,732

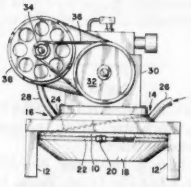
POWER DEVICE FOR COLLECTING MATERIAL FROM CREVICES FOR PAN SEPARATION

Alfred Krivda, P.O. Box 1055, Oroville, Calif. 95965

Filed Oct. 26, 1973, Ser. No. 410,039

Int. Cl. E21c *41/14*

U.S. Cl. 299—7 **1 Claim**



1. A device for collecting and separating heavy minerals comprising a housing unit formed of upper and lower gold recovery pans connected edge to edge with seal means therebetween, leg means attached to said upper pan for supporting said device, a vacuum pump having an internal combustion drive motor mounted on said upper pan, a filter extending across said upper pan dividing said housing into upper and lower, chambers, an opening in said upper pan located in said upper chamber, a flexible hose extending between said opening and the intake of said vacuum pump, another opening in said upper pan located in said lower chamber, a flexible hose connected to said opening in said lower chamber for collecting material from crevices or the like, and said lower pan being readily detachable from said upper pan whereby said lower pan is operable by hand to separate heavy minerals from the material collected therein.

3,874,733

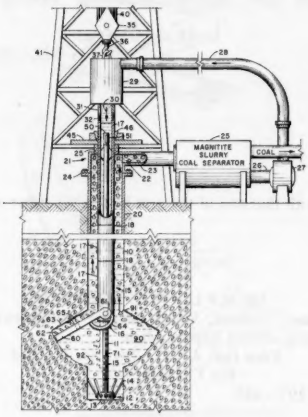
HYDRAULIC METHOD OF MINING AND CONVEYING COAL IN SUBSTANTIALLY VERTICAL SEAMS

William N. Poundstone, Pittsburgh, Pa., and William J. Miller, Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Aug. 29, 1973, Ser. No. 392,576

Int. Cl. E21c *37/06*

U.S. Cl. 299—17 **4 Claims**



1. The method of producing coal from a seam of coal comprising:

boring a substantially vertical pilot hole into said seam of coal;

inserting a retracted coal dislodging tool into said bored pilot hole;

extending said dislodging tool;

raise drilling with said extended dislodging tool to form a cylindrical cavity;

injecting under pressure into said bored pilot hole and said formed cavity, material having a specific gravity greater than said coal;

removing said dislodged coal and said material through said pilot hole;

separating accumulated amounts of said dislodged coal and material being removed from said bored pilot hole;

re-injecting said separated material into said bored pilot hole; and

continuing to raise drill until said dislodging tool is in close proximity to the surface of said seam of coal.

3,874,734

ADVANCEABLE SUPPORT ASSEMBLY WITH INCLINATION CONTROL FOR LONGWALL GUIDE

Lubomir Plevak, Horstmar; Egon Wojaczek, Bockum-Hovel; Harry Rosenberg, Ludinghausen, and Kunibert Becker, Werl, all of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Wethmar near Lunen, Westphlia, Germany

Filed July 13, 1973, Ser. No. 378,844

Claims priority, application Germany, July 13, 1972, 2234452

Int. Cl. E21c *29/08*

U.S. Cl. 299—32 **12 Claims**

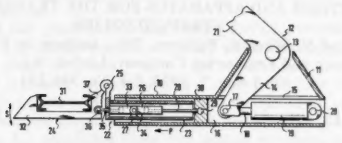
1. An advanceable support assembly for use in mine workings; said assembly comprising

a. a hollow floor member;

b. a hollow jack beam arranged in telescopic manner within the floor member;

c. guide means for accommodating a conveyor connecged to said jack beam;

d. a first hydraulic piston and cylinder unit disposed within the jack beam for effecting relative movement between the floor member and the jack beam; and



e. a second hydraulic piston and cylinder unit also disposed within the jack beam for adjusting the inclination of the guide means, the first and second units being arranged in a substantially horizontal position and coaxial with one another.

3,874,735

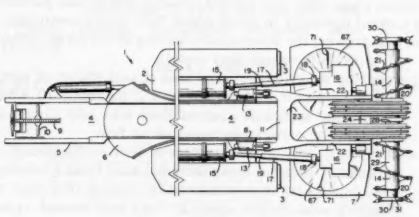
MINING MACHINE

Frank A. Delli-Gatti, Jr., Amity, Pa., assignor to Lee-Norse, Company, Chaleroi, Pa.

Division of Ser. No. 243,973, April 14, 1972, Pat. No. 3,817,579. This application Oct. 4, 1973, Ser. No. 403,379

Int. Cl. E21c *27/24*

U.S. Cl. 299—68 **2 Claims**



1. A mining machine comprising a chassis, a boom mounted on said chassis for vertical movement thereto and projecting forwardly of said chassis, rotary cutter head means including shaft means and drum means mounted on said shaft means for rotation therewith, said drum means comprising a central drum and outer drums adjacent opposite ends of said central drum, supporting arm means including a supporting arm projecting between said central drum and each of said outer drums rotatably supporting said shaft means on said boom to mount said cutter head means to said boom, gathering means below said boom for gathering material mined by said cutter head means, said cutter head means including first sprocket means associated with said central drum adjacent each of its ends and second sprocket means associated with said outer drums at their ends adjacent to said central drum, driving chain means generally centrally of said cutter head means for rotatably driving said cutter head means, said driving chain means including a driving chain drivingly connected to each of said first sprocket means and the thereadjacent said second sprocket means, cutter means carried by said driving chains for mining material during the driven movement of said driving chains, said driving chains including upper and lower runs, and driving means connected to said driving chains for longitudinally driving said driving chains, and the driven movement of said driving chains by their said driving means causing said driving chains to be driven in a direction wherein said lower runs of said driving chains rearwardly convey material towards said gathering means.

3,874,736

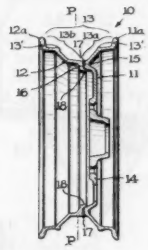
WELDED VEHICLE WHEEL AND METHOD OF PRODUCING SAME

Paul E. Anderson, Torrance; William W. Cunningham, Lomita, and George B. Kortz, San Pedro, all of Calif., assignors to Martin Marietta Aluminum Inc., Torrance, Calif.

Filed Dec. 27, 1972, Ser. No. 319,032

Int. Cl. B06b *3/00*

U.S. Cl. 301—63 R **19 Claims**



1. A welded two piece aluminum or aluminum alloy vehicle wheel provided with a central body and a split peripheral flange having axially spaced inner and outer continuous annular rims for mounting a tire thereon, said wheel comprised of:

a. a first member having a portion constituting said central body and having another portion constituting an integrally formed continuous circumferential partial base flange at least part of which is offset transversely relative to a normally upright plane of said central body, said partial base flange terminating in a radially outwardly extending continuous annular rim constituting one of the aforesaid rims; said partial base flange also having an annular weld face generally at flange level position;

b. a second member shaped to form only the remainder portion of said peripheral base flange and as well as the other continuous rim, and having an annular weld face for complemental disposition adjacent said annular weld face of said first member;

c. said first and second members having their flange portions of predetermined lateral width, for different width wheels, and joined together at their complementally disposed flange weld faces by a substantially continuous annular tapered wedge shaped welded seam elongated in cross-section in the direction of said weld faces; and

d. said second member having an axially inwardly positioned annular edge portion abutting said first member, said weld face of said second member extending along a lateral face of said second member separate from but adjacent to said edge portion.

3,874,737

SLAG SAND COLLECTING HOPPER FOR A SLAG SAND WATER MIXTURE DRAINAGE SILO

Walter Schurhoff, Dortmund, Germany, assignor to Hoesch Werke Aktiengesellschaft, Dortmund, Germany

Filed Dec. 11, 1973, Ser. No. 423,806

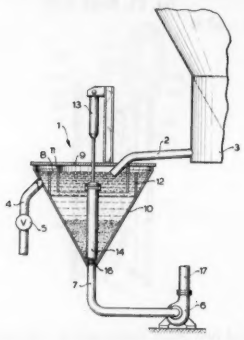
Claims priority, application Germany, Aug. 18, 1973, 2341847

Int. Cl. B65g *53/30*

U.S. Cl. 302—15 **3 Claims**

1. A sand collecting hopper for use in connection with a slag processing apparatus comprising a pump, which includes: a container having conical housing walls and being adapted to be charged with a slag sand - water mixture and arranged with its smallest portion pointing downwardly and with an outlet opening in said smallest portion, said outlet being connectable to a pump of a slag processing apparatus, means to maintain the water level in said hopper at a predetermined minimum water surface line, a tubular member open at both ends and

arranged in substantially axial alignment with the axis of said outlet opening and having an inner diameter greater than the diameter of said outlet opening, said tubular member being movable from an elevated position in which its lower edge is spaced from the inner surface of said conical housing wall to a lowered position in which the lower edge of said tubular



member substantially sealingly engages the inner surface of said conical housing wall, and means connected to said tubular member for selectively moving the same from its lowered position to its elevated position and vice versa, the length and stroke of said tubular member being such that the upper end of said tubular member stays below said predetermined minimum water surface line in said hopper at all times.

3,874,738

PROCESS AND APPARATUS FOR THE RAPID TRANSFER OF A PRODUCT FROM A GAS STREAM INTO A CARRIER GAS STREAM

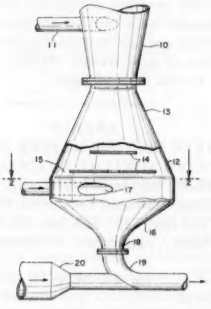
Heinz Winkler, Burghausen; Siegfried Strebel, Raitenhaslach, both of Germany, and Ferdinand Reich, Braunau, Austria, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Feb. 5, 1974, Ser. No. 439,817

Claims priority, application Germany, Feb. 5, 1973, 2305497

Int. Cl. B65g *53/28, 53/40*

U.S. Cl. 302—21 **5 Claims**



1. A process for rapidly transferring a product from a gas stream into a carrier gas stream while avoiding an intermixture of the two gas streams which comprises separately introducing the product-containing gas stream and the carrier gas stream at different levels into a separating apparatus, maintaining separation of the two gas streams by insert means forming an annular slot with the wall of the lower part of the apparatus, and deflecting the product particles entering with said first gas stream to pass through the slot and thereby to meet the carrier gas stream at the lower level, by which stream they are taken along, and finally withdrawing the carrier gas stream with the particles therein at the bottom of the apparatus.

3,874,739

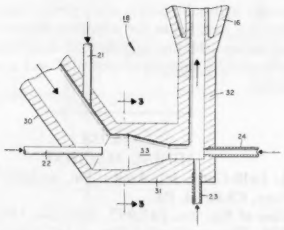
METHOD AND APPARATUS FOR THE TRANSFER OF ENTRAINED SOLIDS

Willard N. Mitchell, Baytown, Tex., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Aug. 7, 1973, Ser. No. 386,231

Int. Cl. B65g *53/04*

U.S. Cl. 302—24 **20 Claims**



1. A method for the transfer of solid particles from a first vessel in which a stream of said particles moves downwardly in dense phase flow to a second vessel in which said particles are carried upwardly in dilute phase flow which comprises:

a. withdrawing the downwardly moving dense phase stream of particles from said first vessel;

b. reducing the cross-sectional area of said stream of particles by a factor of from about 1.2 to about 10 while introducing sufficient gaseous fluid into said stream to maintain the particles in dense phase flow;

c. abruptly changing the direction of flow of the stream of particles of reduced cross-sectional area from a substantially horizontal to a substantially vertical direction by directing said stream upwardly into said second vessel while injecting sufficient additional gaseous fluid upwardly into said stream of reduced cross-sectional area to maintain the particles in dense phase flow; and

d. thereafter introducing upwardly into said second vessel sufficient gaseous fluid to effect a rapid transition from dense phase flow to dilute phase flow.

3,874,740

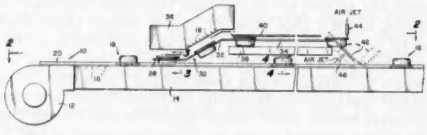
ORIENTING APPARATUS FOR CAP-SHAPED MEMBERS

Stanley E. Hurd, Sunnyvale, Calif., assignor to The Motch & Merryweather Machinery Company, Euclid, Ohio

Filed Feb. 22, 1973, Ser. No. 334,595

Int. Cl. B65g *53/04*; **B23q** *7/12*

U.S. Cl. 302—31 **9 Claims**



1. An air conveyor for conveying and orienting cap-shaped members having an end flange which extends from opposite sides of said members in substantially coplanar relationship, said air conveyor comprising.

a. a plenum chamber and a horizontally extending perforated deck plate for issuing air jets from said plenum to

convey said cap-shaped members longitudinally in a given direction along a first path on said plate,

1. said air conveyor including at least one section wherein said cap-shaped members are randomly oriented with some of said cap-shaped members having their flanges in a first upper position and others of said cap-shaped members having their flanges in a second downward position,

b. first side guide means for limiting lateral movement of said cap-shaped members as they move longitudinally in said given direction,

c. and separator means defining a second horizontally extending path engageable with said flanges of all of said cap-shaped members having said first of said two positions for separating these cap-shaped members to flow along said second path and those members having their flanges in the second of said two positions moving along said first path,

d. second air jet means to move said cap-shaped members along said second path on said separator means,

e. said second path having a terminal portion in converging relation with the first path,

f. and means for inverting said caps flowing through said terminal portion and for delivering the caps to the first path.

3,874,741
WHEEL BRAKE ANTILOCK SYSTEM WITH NOISE SIGNAL REJECTION CIRCUIT

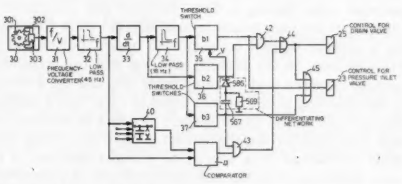
Eberhard Schnaibel, Hemmingen, and Helmut Fleischer, Schwieberdingen, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Sept. 7, 1973, Ser. No. 395,306

Claims priority, application Germany, Sept. 7, 1972, 2243833

Int. Cl. B60t *8/12*

U.S. Cl. 303—21 BE **22 Claims**



1. Fluid brake vehicle antilock system having a wheel brake cylinder, electrically operated and controlled fluid inlet and outlet valve means (**14, 19**),

means (**30, 31, 32, 33**) sensing acceleration of the wheels of the vehicle and including a differentiator (**33**),

threshold switch means including first, second and third threshold switches (**35, 36, 37**) connected to said acceleration sensing means and responding upon predetermined sensed rates of change of wheel speed,

and a logic network connected to said threshold switches selectively controlling the energization of the electrically controlled fluid inlet and outlet valve means to command pressure rise, constant pressure and pressure drop in the wheel brake cylinder;

wherein said acceleration sensing means includes a first low pass filter means (**32**) connected in advance of the input of the differentiator (**33**);

a second low pass filter means (**34**) connected behind the output of the differentiator (**33**);

and conjunctive means (**42**) controlling the electrical control of the outlet valve means (**19**), said conjunctive means having one input connected to the first threshold switch (**35**) and another input connected to the second threshold switch (**36**), said first threshold switch having its input connected to the differentiating means through the second low pass filter means (**34**) and said second threshold switch (**36**) having its input connected to the differentiator (**33**) directly;

the third threshold switch (**37**) being connected to the output of the second low pass filter means (**34**);

and means (**45**) disjunctively connecting the inlet valve means (**14**) and the first and third threshold switches (**35, 37**).

3,874,742
HYDRAULIC BRAKE PRESSURE CONTROL SYSTEM

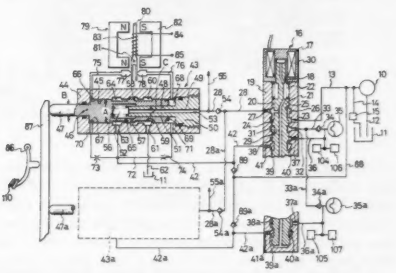
Katuki Takayama, Chiryu, Japan, assignor to Aisin Seiki Kabushiki Kaisho, Kariya, Japan

Filed Sept. 27, 1973, Ser. No. 401,132

Claims priority, application Japan, Sept. 27, 1972, 47-09679

Int. Cl. B60t *8/06*

U.S. Cl. 303—21 F **10 Claims**



1. A hydraulic brake pressure control system for a vehicle having a brake pedal, a source of pressurized fluid and an electric circuit for delivering an output signal indicative of an optimum brake control operation comprising:

a housing having a bore and inlet, outlet and drain ports,

said inlet ports being connected to said source of pressurized fluid,

a spool valve slidably mounted within said bore of said housing for controlling hydraulic communication between said inlet, outlet and drain ports,

a push rod associated with said brake pedal and associated mechanically with said spool valve for actuating the latter,

a reaction member providing a return force for urging said spool valve in its original position against a pedal depressing force acting on said push rod,

said reaction member having one end which is exposed to an output pressure in said outlet port,

a pair of hydraulic pressure chambers opposedly formed at both ends of said spool valve and in fluid communication with said source of pressurized fluid through conduit means, said conduit means comprising a first conduit communicating with one of said hydraulic pressure chambers and a second conduit communicating with the other of said hydraulic pressure chambers, each of said first and second conduits having an orifice through which said pressurized fluid may be supplied to said hydraulic pressure chambers, and

an actuator electrically connected to said electric circuit for controlling the hydraulic pressure in at least one of said chambers in accordance with said indicating signal whereby said hydraulic pressure in said one chamber will assist said spool valve to move to increase the hydraulic pressure at said outlet port when the hydraulic pressure in said one chamber is greater than that in said other chamber, and the hydraulic pressure in said other chamber will assist said spool valve to move to decrease the

hydraulic pressure at said outlet port when the hydraulic pressure in said other chamber is greater than that in said one chamber.

3,874,743

BRAKE ANTILOCK SYSTEM WITH MONITOR CIRCUITRY

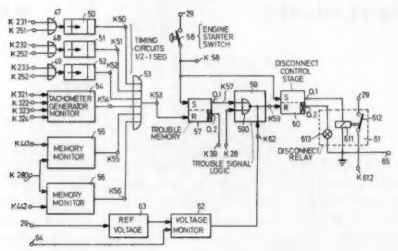
Helmut Fleischer, Schwieberdingen, and Eberhard Schnaibel, Hemmingen, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Oct. 11, 1973, Ser. No. 405,555

Claims priority, application Germany, Nov. 3, 1972, 2253867

Int. Cl. B60t *8/08*

U.S. Cl. 303—21 AF **46 Claims**



1. Vehicle fluid brake antilock system with a monitor and supervisory system and in which the vehicle has a starting switch (**58**) said system having

a supply circuit (**29, 65**);

a brake command means (**10, 11, 12**) and means (**27, 28, K28**) sensing operation thereof;

electromagnetically controlled pressure and drain valve means (**14, 19; 23, 25**) respectively controlling application of pressurized brake fluid to a wheel brake (**16, 17, 18**) and drainage of pressurized brake fluid therefrom;

anti-lock circuit means controlling selectively energization of said valve means;

the supervisory and monitor system comprising

means (**50, 51, 52; 54, 55, 56**) including timing means (**50, 51, 52**) associated with and connected to each of the antilock systems associated with separate wheels, or axles of the vehicle, and providing a trouble or malfunction signal upon sensing persistence of energization of the valve means beyond a predetermined duration;

a common trouble signal logic stage (**59**) and a trouble memory (**57**) comprising a bistable circuit, the logic stage having a logic circuit (**590**) connected to and controlled by said separate timing means (**50, 51, 52**) and the brake operation sensing means (**27, 28; K28**), said logic stage having a transfer function to store the trouble signal until termination of braking, as sensed by the brake operation sensing means, and then providing a disconnect signal;

the starting switch (**58**) being connected to the set input (S) of the bistable trouble memory circuit (**57**) to activate the memory upon starting of the vehicle;

connection means (**53**) connecting said malfunction signal providing means (**50, 51, 52, 54, 55, 56**) and the reset input (R) of the trouble memory (**57**);

the output (**K57**) of said trouble memory being connected to one input of said common trouble signal logic stage (59, **590**); and

a disconnect circuit means (**60, 61; 61*a*, 61*b*, 61*c***) controlled by said disconnect signal, disconnecting connection of said valve means (**14, 19; 23, 25**) to the supply circuit (**29, 65**).

3,874,744

ANTISKID DEVICE FOR PRESSURE-MEDIUM OPERATED BRAKES

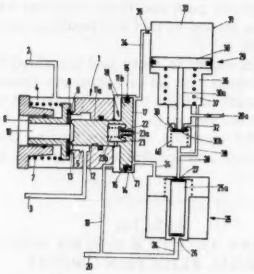
Johann Huber, Munich, Germany, assignor to Knorr-Bremse GmbH, Munich, Germany

Filed Nov. 9, 1973, Ser. No. 414,342

Claims priority, application Germany, Nov. 10, 1972, 225498

Int. Cl. B60t *8/02*, *15/02*

U.S. Cl. 303—21 F **2 Claims**



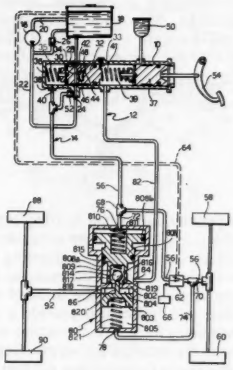
1. In an antiskid device for pressure-medium operating brakes in a vehicle, the combination of an antiskid valve connected between a brake control line and a brake cylinder line and having a braking position and a skidding position, said antiskid valve having a first chamber and connected to a pressure relief line, means in said antiskid valve for establishing a passage therein between said brake control and brake cylinder lines in the braking position and for establishing a passage between said brake cylinder line and the atmosphere in the skidding position, said antiskid valve has a differential pressure piston the larger surface of which is directed toward said first chamber and the smaller surface area being continuously connected to a source of pressure-medium, a check valve defining a throttle passage in said piston connecting the smaller surface to said larger surface thereof, valve means responsive to skidding for connecting said first chamber to said pressure relief line when skidding occurs and having means for connecting said first chamber to a source of pressure-medium in the braking position, a normally open monitor valve connected in said pressure relief line, means for closing said monitor valve in response to a delay in the return of the antiskid valve to the braking position exceeding that of a skidding action, and means including a throttle restriction bypassing said skid responsive valve means for supplying pressure-medium to said first chamber so that the antiskid valve is returned to the braking position when the skid responsive valve means continues to connect the antiskid valve first control chamber to the pressure relief line for a time in excess of a skidding action, said monitor valve has a second chamber connected to said first chamber through said throttle restriction, said monitor valve comprises a cylinder having a moveable piston therein defining a second chamber on its larger surface and a spring chamber on its smaller surface, a spring within said spring chamber acting upon said piston to close the monitor valve, a valve member in said pressure relief line connected to said piston to open and close said line, means connecting said spring chamber to said pressure relief line upstream of said valve member, and a throttle passage bypassing said valve member.

3,874,745

ANTI-SKID DEVICE FOR HYDRAULIC BRAKE MECHANISMS

Marco Peruglia; Giuseppe Amedei, both of Turin; Antonino Bertone, Sant Antonino, and Giulio Dotti, Turin, all of Italy, assignors to Fiat Societe per Azioni, Turin, Italy

Filed May 9, 1974, Ser. No. 468,601
Claims priority, application Italy, May 15, 1973, 68388/73
Int. Cl. B60t *8/02*
U.S. Cl. 303—21 F 5 Claims



1. A hydraulic braking system for a motor vehicle, of the type comprising:

at least one brake cylinder connected to a wheel of a first axle of said motor vehicle,

a hydraulic fluid reservoir,

a pump connected to the reservoir to draw fluid therefrom, fluid control means connected downstream of said pump to receive fluid therefrom,

means connecting said fluid control means to said reservoir, first fluid conduit means connecting a circuit point between said pump and said fluid control means to said brake cylinder, wherein the improvement consists in said fluid control means including:

a master cylinder closed at one end,

a first port in said master cylinder connected to the output end of said pump,

a second port in said master cylinder connected to said fluid reservoir,

stop means projecting into said master cylinder,

a first piston slidable within said master cylinder, said first piston having a passage interconnecting said first and second ports in said master cylindner when said first piston is in a rest position abutting against said stop means,

restrictor throttle means in said piston, said restrictor throttle interconnecting said first and second ports when said piston is moved out of said rest position towards said one end of said master cylinder, thereby causing a restriction of the communication between said first and second ports,

a first compression spring between said closed end of said master cylinder and said first piston, urging said first piston to abut against said stop means;

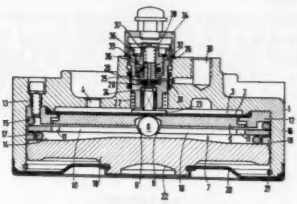
a second piston slidable within said master cylinder on the opposite side of said stop means from said first piston, means linking said first piston to a brake pedal operable to urge said second piston towards said first piston, and a second compression spring between said first and second pistons.

3,874,746

BALANCING VALVE FOR A LOAD-RESPONSIVE BRAKE PRESSURE REGULATOR FOR VEHICLES

Hans Pollinger; Bernd Wosegien, both of Munich; Eckart Saumweber, Gauting, and Thomas Storzinger, Unterfohring, all of Germany, assignors to Knorr-Bremse GmbH, Munich, Germany

Filed Sept. 20, 1973, Ser. No. 399,198
Claims priority, application Germany, Sept. 27, 1972, 2247294
Int. Cl. B60t *8/18*
U.S. Cl. 303—22 R 8 Claims



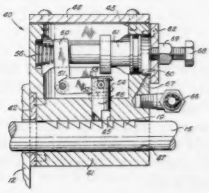
1. A balancing valve for a load-responsive brake pressure regulator for vehicle brakes using a pressure medium and comprising a housing, pressure regulator valve means within said housing for establishing a control pressure proportional to the load of the vehicle, a spring plate supported within said housing and acting upon valve means, moveable means (18) within said housing responsive to the load of the vehicle and acting against said spring plate on an intermediate annular portion thereof such that said spring plate is responsive to a proportion of the vehicle load and divides the force acting thereon by moveable means, a flexible diaphragm responsive to the forces of the control pressure of said valve means and acting against said spring plate to exert a restoring force opposite to the vehicle load, said spring plate having portions thereof removed to reduce the spring rigidity thereof.

3,874,747

FLUID ACTUATED BRAKE LOCKING MECHANISM

Walter Case, 10426 Desdemona St., and William F. Benefield, 10351 Fern Dr., both of Dallas, Tex. 75228

Continuation-in-part of Ser. No. 179,751, Sept. 13, 1971, abandoned. This application Oct. 3, 1973, Ser. No. 402,891
Int. Cl. B60t *17/16*
U.S. Cl. 303—89 5 Claims



1. In a fluid operated brake setting system for heavy vehicles including, for each wheel unit, a brake, a brake actuator chamber and a brake actuator rod reciprocated by said actuator chamber and operatively connected to the wheel unit brake; a brake locking mechanism comprising:

a casing adapted to be mounted in association with said actuator chamber; said casing having a first passage therethrough, for accommodating the brake actuator rod for reciprocating movement, and a second passage transverse to and communicating with said first passage;

said brake actuating rod being provided with longitudinally spaced transverse rack teeth; a pawl rod supported and guided for reciprocating movement in said second passage, having pawl means at one end for engagement with said rack teeth;

means in said casing defining a cylinder chamber; piston means disposed in said cylinder chamber for reciprocating movement; means coupling said piston means to said pawl rod;

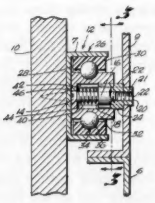
spring means coupled to said pawl rod, normally urging said pawl rod in a first direction relative to said first passage to engage said pawl means with said rack teeth; conduit means communicating said cylinder chamber with a source of pressurized fluid acting on said piston and urging said pawl rod in a second direction relative to said first passage to disengage said pawl means from said rack teeth.

3,874,748

ADJUSTABLE ROLLER ASSEMBLY AND SUSPENSION MEANS

Ruben Figueroa, 75 E. 13th St., Hialeah, Fla. 33010

Filed Aug. 22, 1973, Ser. No. 390,598
Int. Cl. F16c *29/00*
U.S. Cl. 308—6 R **3 Claims**



1. A slide and guide assembly including a guide member adapted to be mounted to a drawer and a roller assembly adapted to be mounted to a cabinet, said adjustable roller assembly including:

a bushing having a first end and a second end and a threaded bore extending axially from the first end of said bushing toward said second end, said bore sized for threaded engagement with said screw,

exterior key means on the first end of said bushing,

a roller having an axially facing first and second face and including,

an inner race, an outer race, bearings captivated between the races, and a roller member on the outer race,

said inner race having a through axial bore of a predetermined diameter greater than the diameter of said threaded screw and the diameter of said bushing, and a keyway in the inner race extending axially from the second face of said roller,

a radially inwardly extending shoulder constricting the mouth of said bore of said inner race adjacent said first face of said roller with an opening sized for passage of said threaded screw,

a coil spring of a diameter greater than the diameter of said threaded screw captivated between said shoulder and the bushing, whereby, said threaded screw extends through the bore of said inner race and into threaded engagement with said threaded bore and said bushing, said roller is adapted to be moved inwardly and outwardly relative to said bushing on sliding movement of said key in said keyway; and

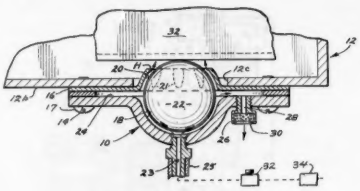
means to mount said bushing to a first surface said roller assembly mounted for relative movement with respect to said guide assembly.

3,874,749

GAS SUSPENDED BEARING

Dominic J. Maniak, Minneapolis, Minn., assignor to The Pillsbury Company, Minneapolis, Minn.

Filed Dec. 3, 1973, Ser. No. 421,000
Int. Cl. F16c *39/04;* **B65g** *13/00*
U.S. Cl. 308—9 **4 Claims**



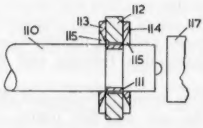
1. A gas suspended caged ball bearing comprising a load supporting ball housing formed from a ductile material having a pressure formed recess therein conforming to the shape of the portion of a sphere, said ductile material being displaced by the pressure application of the form of said ball thereagainst to define said recess and provide a smooth surface therein, said ball being located in the recess with substantially the same radius as the recess, a gas supply duct means communicating with the recess for supplying gas thereto to provide a load supporting gas film between the ball and the recess on the lower side of the ball, a ball retaining means connected to the housing and enclosing the top side of the ball to prevent the ball from falling out, said retaining means exposing the top of the ball whereby the top portion of the ball projects upwardly and is adapted to contact a load and at least one gas releasing passage communicating between the interior of the housing and the exterior thereof around the portion of the ball in the retaining means for releasing gas supplied to the housing through the duct under all conditions including times when the ball is pressed against the retaining means to prevent the ball from sealing the retaining means against the escape of the gas.

3,874,750

THRUST BEARINGS

Bernard James Greig, Bradford, England, assignor to Lucas Aerospace Limited, Birmingham, England

Filed Mar. 26, 1973, Ser. No. 344,554
Claims priority, application United Kingdom, Mar. 25, 1972, 14119/72; Sept. 21, 1972, 43719/72; Dec. 2, 1972, 55802/72
Int. Cl. F16c *39/06*
U.S. Cl. 308—10 **6 Claims**



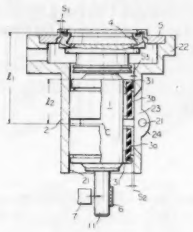
1. A permanent magnet thrust bearing including a stationary member, a shaft, and a member mounted on the shaft, one of said members being of high permeability material and the other said members comprising a permanent magnet, the

members being continously presented to each other so that in use during rotation of the shaft, the magnetic flux serves to locate the shaft axially with respect to the stationary member, said one member being mounted on said shaft, said other member being annular and having opposite axial faces and a pair of annular pole pieces located against said opposite axial faces of the other member.

3,874,751
DEVICE FOR SUPPORTING A SPINDLE OF AN OPEN-END SPINNING APPARATUS

Kenji Okubo; Satour Endo, and Shoji Oka, all of Ishibe, Shiga-ken, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya-shi, Aichi-ken and nippon Seiko Kabushiki Kaisha, Tokyo, both of Japan

Filed Jan. 23, 1974, Ser. No. 435,943
Claims priority, application Japan, Jan. 29, 1973, 47-12227
Int. Cl. F16c *35/08*
U.S. Cl. 308—26 **5 Claims**

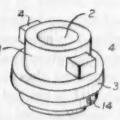


1. In a device for supporting a spindle of an open-end spinning apparatus wherein a bushing member is mounted on a machine frame and a spindle shaft of a spinning rotor is turnably supported by a bearing which is coaxially disposed within a cylindrical inner wall of said bushing member, the improvement comprising a pair of resiliently yieldable spaced members in a ring-shaped space between the cylindrical inner wall of said bushing member and a peripheral surface of said bearing at both axial end portions of said bearing, each of said resiliently yieldable members comprising an inner protection ring rigidly mounted on an end peripheral portion of said bearing member and an outer protection ring held by said inner cylindrical wall of said bushing member and a ring-shaped resiliently yieldable piece sandwiched by said inner and outer protection rings.

3,874,752
SYNTHETIC RESIN-MADE BEARING

Yasutaka Imazaike, 22 Tanabe Nishino-cho 8-chome, Higashi-Sumiyoshi-ku, Osaka, Japan

Filed Jan. 18, 1974, Ser. No. 434,369
Int. Cl. F16c *33/20*
U.S. Cl. 308—238 **8 Claims**

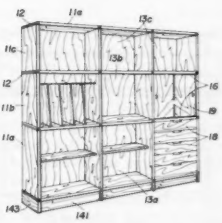


1. A bearing for small size precision instruments and the like comprising a bearing body having a cylinder opening for a shaft, a flange or said bearing body, protrusions extending outwardly from said bearing body and axially spaced from said flange, a base plate having an opening in which said bearing body is received, said base plate having means defining notches corresponding to the spacing and configuration of said protrusions on said bearing body, and cooperable securing means on said protrusions and said base plate operable to secure said bearing body in position on said base plate upon insertion of said bearing body and protrusions into said base plate opening and said notches respectively and upon subsequent rotation of said bearing body relative to said base plate until said securing means is engaged, whereby said bearing body is secured to said base plate as the latter is engaged between said protrusions and said flange.

3,874,753
UNIT FURNITURE

Buni Naito; Masao Sumi; Kunihiro Aoki, all of Tokyo, and Jutaro Hosoi, Gunma, all of Japan, assignors to Iwate Fuji Sangyo Kabushiki Kaisha, Tokyo, Japan

Filed July 21, 1972, Ser. No. 273,928
Int. Cl. F16b *12/02*
U.S. Cl. 312—111 **13 Claims**



1. Unit furniture for a furniture system expandable from a base unit of component parts which comprises:

a. a plurality of generally rectangular and flat main plates defined by lateral side and end edges, a flute formed in at least one face of said plate extending between the end edges, parallel and proximate to the rear lateral side edge, and including a plurality of vertically spaced horizontal main plates and a plurality of laterally spaced vertical side main plates;

b. first engaging means associated with both end edges of the plate and extending between the front and rear lateral side edges and outwardly from the end edges of the plate;

c. a plurality of generally square cross-sectional substantially horizontally transversely extending joint poles, each side having a width substantially equal to the thickness of said plate, the pole having a length substantially equal to the width of said plate;

d. second engaging means associated with each of the four sides of the joint poles, and being defined by grooves formed in the sides of said joint poles and having a cross-sectional configuration complementary to the cross-sectional configuration of said first engaging means the second means having a cross-sectional configuration complementary to the cross-sectional configuration of the engaging means of said main plate and being in telescopic engagement therewith;

e. a substantially vertical rear plate, having a generally rectangular flat configuration and a thickness slightly smaller than the width of and engaging the flute of the main plate, and having length and width dimensions substantially the same as the main plate, so that assembly of the plates and joint poles may be effected by coupling two main plates at right angles to each other by the joint poles and then inserting the rear plate in the flutes of the opposing surfaces of the main plate, and then coupling two additional main plates at right angles to the first main plates there is obtained a box-like unit frame, and by

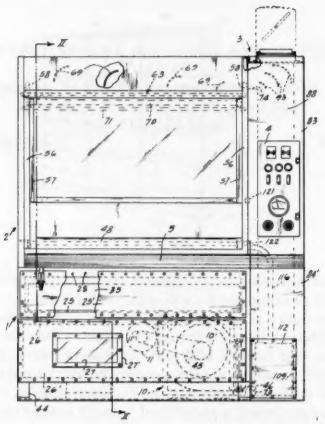
coupling additional component parts to this unit frame to obtain a desired furniture system;

said joint pole having a length corresponding to the width of said main plate, and said rear plate having angled notches formed at its four corners, and registering with the rear sections of respective joint poles, each side of said angled notch having a length corresponding to the depth of the flute formed in said main plate, at least one of said main plates having said flutes formed in the opposite faces thereof and a rear plate engaging each of said opposite flutes and extending in opposite coplanar directions from the respective main plate.

3,874,754
BIOHAZARD SAFETY CABINET

George T. Saunders; Joseph S. Lattuca, and Dorman C. Richards, all of Adrian, Mich., assignors to Kewaunee Scientific Equipment Corporation, Adrian, Mich.

Filed Nov. 27, 1972, Ser. No. 309,764
Int. Cl. A47b *81/00*; A61b *19/82*; B01i *9/02*
U.S. Cl. 312—209 10 Claims

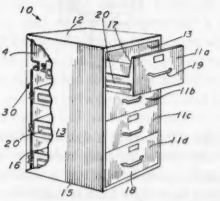


1. In a biological safety cabinet for preventing contamination externally of the cabinet from a contaminant disposed therein, the combination of a hollow base structure, the upper portion of which is constructed to form a work surface, a hood structure extending above said work surface and adapted, in normal operation, to form a chamber enclosing said work surface, with the exception of an access opening adjacent one edge of said work surface, through which air may enter from exteriorly of the cabinet, the wall of said hood structure above said access opening being provided with a transparent window through which the interior thereof may be viewed, said base structure having openings therein adjacent said work surface for the flow of air from the hood interior into the base structure, an air distribution structure extending over the work surface, operative to discharge air in a downward direction toward said work surface, a vertically extending duct structure disposed adjacent the base and hood structures and operatively connecting the air distribution structure and said base structure and therewith forming an air path for the circulatory flow of air from said air distribution structure downwardly through said hood, through said openings in said base structure and said duct structure back to said air distribution structure, a contaminate filter disposed in said air flow path and positioned in said base structure below the plane of said work surface, operative to intercept and filter the air flowing through said openings in the base structure, air moving means, having an air inlet and an air outlet, disposed in said air flow path intermediate the discharge side of said filter and said air distribution structure, with its air inlet disposed to receive air which has passed through the filter, and its air outlet disposed to effect movement of air through said air distribution structure, said air flow path having an air discharge vent therein, at the air discharge side of said air moving means, through which a portion of the air flow in said path may be discharged from the cabinet, said air moving means being operative to draw all air, entering said chamber from said air distribution structure and from exteriorly of the cabinet, through said openings and through said filter, with the contaminated volume of the cabinet thus being restricted to that portion of the base structure operatively disposed between the work surface and the filter, with the air moving means, the upper portion of the hood and the connecting duct structure all being subjected only to uncontaminated air, the exterior walls of said contaminate-subjected portion of the base structure being of air-tight construction with respect to the exterior thereof.

3,874,755
ANTI-TILT LOCK MECHANISM

Thomas R. Hegg, Michigan City, and Michael D. McCormack, Portage, both of Ind., assignors to Interstate Industries, Inc., Mundelein, Ill.

Filed Oct. 29, 1973, Ser. No. 410,763
Int. Cl. E05b *65/46*; E05c *15/04*
U.S. Cl. 312—221 5 Claims



1. In a filing cabinet comprising a cabinet frame, a plurality of vertically stacked drawers slidably supported within said frame for inward and outward movement with respect thereto, and an anti-tilt lock mechanism for maintaining the remaining drawers fixed within said cabinet when one of said drawers is pulled outwardly from said cabinet, said anti-tilt lock mechanism comprising

a lock rod carried by said cabinet and extending generally vertically therewithin,

collar means affixed to said cabinet frame and constituting guide means for said lock rod during vertical shifting thereof;

a plurality of pin means secured to and extending laterally outwardly from said lock rod at vertically spaced positions therealong correlated with respective said drawers for locking engagement therewith;

vertically disposed catch-plate means affixed to each said drawers and projecting outwardly therefrom, each said catch-plate means being formed with a rearwardly opening, generally V-shaped slot adapted to receive therewithin and across a corresponding pin means carried by said lock rod; and

detent means affixed to said cabinet frame and said lock rod and adapted to retain said lock rod and each of the pin means connected thereto in an elevated position when said lock rod is shifted upwardly;

the improvement wherein said slot includes upward and rearward channels diverging upwardly from a junction thereof, said rearward channel opening rearwardly of said catch-plate means;

and wherein walls bounding said slot include a first bearing edge for said pin means, said first bearing edge being pitched rearwardly and upwardly and constituting a lower margin of the rearward channel of said slot;

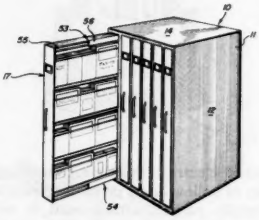
whereby upon pulling one of said drawers outwardly from said cabinet frame said first bearing edge abuts against a corresponding pin means to elevate said pin means and the lock rod connected thereto, thereby to raise said pin means in each said upward channel of said catch-plate means of each remaining drawer of the cabinet and to lock the remaining drawers within the cabinet against withdrawal therefrom.

3,874,756

BROCHURE FILING SYSTEM

Kenneth E. Greene, 307 Newman Ct., Lake Bluff, Ill. 60044

Filed Apr. 27, 1973, Ser. No. 355,078
Int. Cl. A47b *81/00, 88/00*
U.S. Cl. 312—234 **1 Claim**



1. A storage unit for information brochures and the like, comprising: a cabinet, and a plurality of vertically disposed drawers disposed within the cabinet in side-by-side relationship to one another with cooperating slide and track means between each drawer and the cabinet for movement of each drawer into and at least partially out of the cabinet, each drawer being divided into two opposing display areas by a central spine means with each display area comprising a bottom shelf and at least one upper shelf and with each of the shelves having marginal edges spaced a predetermined distance outwardly to each side of the spline means, and a pair of vertically disposed information retaining visors of transparent and relatively stiff material associated with each shelf and with a visor of each pair mounted along the adjacent marginal edge at the front portion of its associated shelf and extending upwardly therefrom to form an information retaining pocket having a facial area of predetermined extent, each visor covering a major front portion of its associated facial area but less than the entire facial area and with the upper edge of each visor below a next adjacent upper shelf positioned beneath the adjacent marginal edge of the adjacent upper shelf tending to reduce ingress of dirt and preventing pocketed material from toppling out and forming a laterally open access area between the upper edge of each visor and the adjacent marginal edge of an upper shelf through which pocketed material can be withdrawn while permitting viewing of information on the pocketed material through the visor below the upper edge thereof.

3,874,757

COMPARTMENTED CASE PROVIDING ENLARGED WORK SUPPORTING SURFACE

Artemas D. Marty, 19585 S.W. Celebrity, Beaverton, Oreg. 97005

Filed June 28, 1974, Ser. No. 483,948
Int. Cl. A47b *85/00*
U.S. Cl. 312—240 **13 Claims**

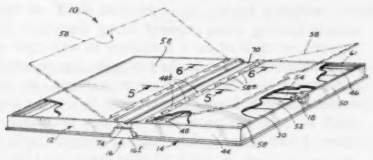
1. A case comprising

a first side having a substantially planar inner side member and an outer member spaced therefrom to define a compartment therebetween,

a second side having a substantially planar inner side member and an outer side member spaced therefrom to define a compartment therebetween, said second side disposed with an elongate edge margin thereof adjacent an elongate edge margin of said first side,

an elongate backing member disposed intermediate said edge margins of said sides,

hinge means pivotally connecting said sides to said backing member intermediate their inner and outer side members for swinging about laterally spaced pivot axes between a closed position wherein said inner side members of said first and second sides face and are contiguous each other and an open position wherein said inner side members extend outwardly in opposite directions from said backing member, with support surfaces of said inner side



members disposed in a substantially common plane spaced from said backing member,

an elongate plate mounted intermediate said adjacent edge margins of the sides for shifting between a lowered position contiguous said backing member and a raised position spaced outwardly therefrom with a support surface of said plate disposed substantially in the plane occupied by said support surfaces of the inner sides when in their open positions, and

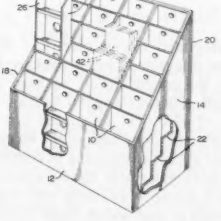
operator means operatively connected to said plate for shifting the same to its lowered position on swinging said sides to their closed position and to its raised position on swinging said sides to their open positions.

3,874,758

STORAGE AND DISPLAY ASSEMBLY

Jacques Harold Isaacs, Greenwich, Conn., assignor to Textron Inc., Providence, R.I.

Filed Jan. 29, 1973, Ser. No. 327,533
Int. Cl. A47b *97/02;* **A47f** *3/14*
U.S. Cl. 312—278 **3 Claims**



1. A display and storage assembly for articles comprising

a case having front, rear and side walls;

a plurality of step means disposed in the bottom of said case between said front and rear walls and arranged to ascend from said front wall to said rear wall;

a plurality of vertically and individually removable containers held in abutting and slidable relationship between the front, rear and side walls of the case, the bottom of each container being arranged to rest on said step means;

each one of said containers having an open front, a rear wall and side walls;

a plurality of vertically disposed and relatively spaced pairs of horizontal guideways mounted on the side walls of

each container such that a pair of horizontal guideways is disposed on their respective side walls of a container in vertically spaced relation to another pair of horizontal guideways on the container;

a plurality of vertically spaced and horizontally disposed shelves in each container, each one of the shelves being slidably retained between its pair of horizontal guideways of a container, the top of each shelf for supporting an article and along with adjacent upper portions of the rear and side walls of a container forming an article-holding compartment;

a flange extending upwardly from each shelf at the open front of a container for retaining an article in the compartment during use of the container in said case; and

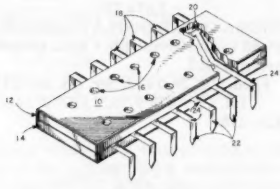
each container having an uppermost shelf, an uppermost article-holding compartment being disposed above the uppermost shelf of each container in said case and each container being open at the top to display an article in the uppermost article-holding compartment, at least one lower article-holding compartment below the uppermost shelf of each container and between successive shelves thereof, the lower article-holding compartment for storing an extra article and having an open front between the successive shelves at the open front of each container, and the open front of each container being normally enclosed by a wall of said case or the rear wall of another container.

3,874,759

ELECTRICAL CONNECTOR SOCKET FOR INTEGRATED CIRCUIT

Jospeh G. Colombo, Apt. D3, Washington Dr., Ramsey, N.J. 07446

Filed Oct. 9, 1973, Ser. No. 404,214
Int. Cl. H05k *1/02*
U.S. Cl. 339—17 CF **3 Claims**



1. An integrated circuit electrical connector socket for mounting an integrated circuit package on a printed circuit board, said integrated circuit package comprising an integrated circuit, a flat rectangular housing for said circuit, and a plurality of electrical integrated circuit leads extending outwardly in a row along each of the longitudinal edges of said housing, said socket comprising in combination:

a. a flat rectangular base having a plurality of socket holes arranged in two rows along the longitudinal axis of said base, each of said socket holes for receiving one of said integrated circuit electrical leads;

b. a plurality of electrical contact members, one of each positioned within each of said socket holes for providing electrical contact with said integrated circuit electrical leads;

c. a plurality of electrical contact pins afixed to said base, one of each associated with one of each of said socket holes, each positioned opposite said associated socket hole and adjacent to the longitudinal edge of said base farthest from said socket hole for providing electrical contact with said printed circuit board; and

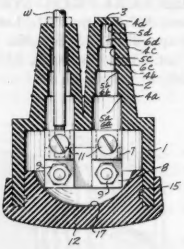
d. a plurality of electrical leads afixed to said base, each for connecting one of said associated contact members and said contact pins.

3,874,760

SHEATHED ELECTRICAL COUPLING

Bernell J. Guthmiller, 12713 S.E. 167th Pl., Renton, Wash. 98055; La Vern R. Guthmiller, 28003 152nd Ave. S.E., and Herbert J. Sullivan, 9904 South 210th Pl., both of Kent, Wash. 98031

Continuation of Ser. No. 248,210, April 27, 1972, abandoned. This application Jan. 28, 1974, Ser. No. 436,990
Int. Cl. H01r *11/02*
U.S. Cl. 339—60 R **4 Claims**



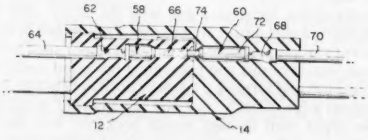
1. A sheathed electrical coupling comprising a sheathing case, a cluster of hollow horns projecting from said sheathing case in generally parallel arrangement, a wire extending through the bore of at least one of said horns into said case, wire-connecting means received in said case and connected to said wire, cap means for closing said case having an aperture therethrough, electrical-conducting means extending through such aperture, a second wire connectible to said electrical-conducting means, and a sheath sleeve encircling the end portion of said second wire and engageable with said cap means, said cap means and said sheath sleeve having interfitting projection and socket means for retaining said sheath sleeve and said cap means in assembled relationship.

3,874,761

CIRCULAR SEALED CONNECTOR

Larry Ronald Stauffer, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 26, 1973, Ser. No. 419,166
Int. Cl. H01r *13/52*
U.S. Cl. 339—60 R **13 Claims**



1. A circular sealed connector comprising:

a plug member having a substantially cylindrical body, a polarized profiled mating portion on one end of said body, an enlarged peripherial projection towards the other end of said body, and a plurality of longitudinal bores through said body, each said bore having a constricted throat portion;

a like plurality of female receptacle contacts each inserted into a respective bore of said plug member, said constricted throat portion biasing said contact closed;

a receptacle member having a substantially cylindrical body with a polarized profiled mating portion, a cylindrical hood integral with said body extending beyond said mating portion, an inwardly directed annular flange on the free end of said hood, and a like plurality of longitudinal bores through said body, said annular flange of said hood extending over said peripherial projection of said plug

member fully mated in said receptacle member to substantially enclose said plug member and form a weather tight seal therebetween; and

a like plurality of male pin contacts each mounted in a respective bore of said receptacle member.

3,874,762

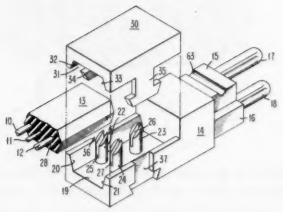
ELECTRICAL CABLE CONNECTING DEVICE

Frank A. Shott, Vestal; Dean W. Skinner, and Vincent P. Subik, both of Binghamton, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 30, 1973, Ser. No. 355,617

Int. Cl. H01r *13/54, 11/20*

U.S. Cl. 339—91 R **4 Claims**



1. An electrical connector plug assembly for terminating the conductor elements of a cable and enabling electrical connection with other electrical terminal means, the assembly comprising:

a. a molded plastic connector housing including a pair of overlying transversely offset quadrilateral extensions at one end thereof and provided with T-shaped cap retaining slots therein,

b. a pair of male type metal pins projecting from the pair of overlying transversely offset quardilateral extensions of said connector housing,

c. the other end portion of said connector housing defining a channel for receiving an electrical cable therein,

d. a set of insulation strippers mounted in the channel of said connector housing comprising three stripper elements adapted to accommodate a tri-lead cable in which a center conductor functions as a signal conductor and is flanked by two outer conductors which function as the ground conductors, each insulation stripper including a cylindrical member having a U-shaped slot therein with the upper portions being tapered to perform a wire insulation piercing and stripping function and make electrical contact with a respective conductor element when disposed therebetween,

e. conductive means electrically coupling each metal pin with a respective one of the insulation strippers wherein the center conductor stripper couples with a signal projecting pin and the outer conductor strippers are coupled with a ground projecting pin, and

f. a cable-contacting cap member adapted to overlie the cable and channel and to forceably press the cable into the channel thereby to cause the insulation strippers to remove the insulation from the conductor elements of the cable and cause the conductor elements to enter into the U-shaped slots and make electrical contact with the strippers, said cable-contacting cap member is provided with T-shaped cap retaining projections adapted to cooperate with the T-shaped cap retaining slots in the connector housing for securing the cap to the housing.

3,874,763

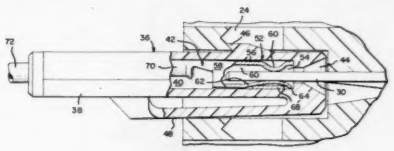
PLUG FOR PATCH SYSTEMS

Charles Donald Hoover, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 26, 1973, Ser. No. 419,167

Int. Cl. H01r *13/54*

U.S. Cl. 339—91 R **5 Claims**



1. A high density pluggable patch system comprising:

a receptacle member having a plurality of closely spaced polarized cavities, aperture means interconnecting adjacent pairs of cavities;

a plurality of male terminal contacts each fixedly mounted in a respective one of said cavities;

at least one substantially rectangular plug member adapted to be inserted into any cavity of said receptacle member, said plug member having a transverse profile mating with said polarized cavities, locking lance means extending from one side of said plug, spring means extending in parallel spaced relation longitudinally along an opposite side of said plug with both ends of said spring means integrally connected to said plug, a longitudinal passage through said plug and an aperture in said plug leading to said passage; and

a female receptacle contact adapted to be mounted in said passage in said plug and to receive said male terminal contact therein, said female contact including locking lance means extending into said aperture to fix said female contact in said passage and means for fixing a conductor to said female contact,

said spring means being deformed during insertion of said plug member into said cavity and biasing said locking lance into latching engagement with said cavity aperture when said plug member is fully inserted into said cavity.

3,874,764

LEAD ASSEMBLY

Robert Volinskie, Hershey, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 31, 1973, Ser. No. 411,557

Int. Cl. H01r *9/08, 19/04*

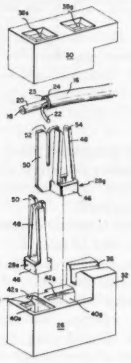
U.S. Cl. 339—97 R **1 Claim**

1. A lead assembly for terminating the signal and ground wires in a coaxial or other like cable and for being slidingly positioned on a set of posts or the like, which comprises:

a. a rectangular base member having a longitudinal axis parallel to the major dimension of said base member, the top surface having an upwardly extending projection positioned across the width thereof at one end, said projection being bisected by a cable-receiving channel extending in the same general direction as the base member's longitudinal axis, a first cavity in the top surface located adjacent the projection and having an extension thereof positioned parallel to the base member's longitudinal axis, and the second cavity in the top surface located remotely from the projection and having an extension positioned normal to the base member's longitudinal axis, said base member further having a pair of passageways extending from the bottom surface into the cavities;

b. a pair of contacts each consisting of a base with a pair of opposing spring arms extending therefrom, and a plate extending from the base in the same direction as the arms, each plate having at its free end a slot extending inwardly towards the base, said slot adapted to receive and electri-

cally terminate one of the wires therein, each contact being positioned in a cavity so that the plate is received in the cavity extension thereby aligning the plate in the first cavity parallel to the longitudinal axis and the plate in the second cavity normal to the longitudinal axis thereby facilitating the terminating of the wires coming into the assembly through the channel; and



c. a cover member for placing over the cavities, said cover member having a pair of passageways therethrough in registration with the passageways in the base member to permit the assembly to be slidingly placed on a pair of posts which would then extend through the passageways and the opposing arms on the contacts.

3,874,765

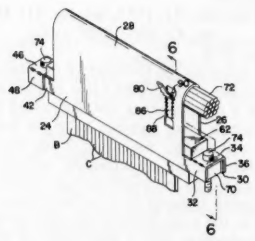
CONNECTOR COVER

Earl A. Gilmore, Silvis, Ill., and Kenneth E. Merklen, Cos Cob, Conn., assignors to Gulf & Western Industries, Inc., New York, N.Y.

Filed Oct. 17, 1973, Ser. No. 407,086

Int. Cl. H01r *13/58*

U.S. Cl. 339—103 M **20 Claims**



1. A cover for a multiple conductor electrical connector block, comprising generally U-shaped wall means of sheet material including a pair of generally parallel legs and bridging means interconnecting said legs in spaced relationship, said legs having ends spaced from said bridging means, and tab means on each of said legs interengaging said legs to limit spreading of said ends in the direction perpendicular to said legs, said tab means including a first tab on one of said legs and a second tab on the other of said legs, said first tab having an outer surface parallel to said one leg, a third tab extending from said second tab toward said one leg, and a fourth tab extending from said third tab and overlying said outer surface of said first tab to restrain separation of said legs in said direction.

3,874,766

DEVICE FOR REMOVABLY HOLDING A PLATE, SUCH AS A PRINTED CIRCUIT BOARD

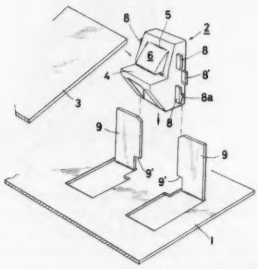
Akira Mizusawa, Kanagawa, Japan, assignor to Nifco Inc., Tokyo, Japan

Filed Apr. 10, 1974, Ser. No. 459,503

Claims priority, application Japan, June 16, 1973, 48-70689

Int. Cl. H02b *1/04*

U.S. Cl. 339—125 R **2 Claims**



1. A synthetic resin device for removably holding a plate such as a printed circuit board comprising: a main block body having a front, a back and two opposite sides; a support projection integrally connected to the lower part of the front of said main block body; a ramp catch the thin end of which is integrally connected to the upper part of the front of said main block and the thick end of said ramp catch is above said support projection, leaving therebetween a space as large as the thickness of said plate; and two or more staggered projections rising from each of the two opposite sides of said main block body and spaced apart from each other by a distance equal to the thickness of associated rising tab plates, the back of said main block body having a recess to accommodate said ramp catch when it is pushed and yieldingly sunk.

3,874,767

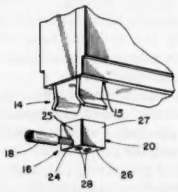
ELECTRIC WIRE AND WIRE TERMINATION ASSEMBLY

Richard Thomas Kennedy, Oak Lawn, Ill., assignor to Bell Electric Company, Chicago, Ill.

Filed Nov. 5, 1973, Ser. No. 413,129

Int. Cl. H01r *11/08*

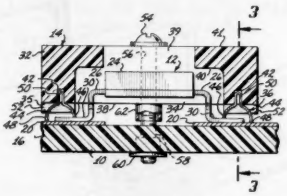
U.S. Cl. 339—147 R **5 Claims**



1. An electric wire, wire termination, and circuit breaker assembly comprising a molded case circuit breaker containaing a bus bar, a spring jaw terminal clip attached to the bus bar and extending outwardly from one wall of the circuit breaker, a recess in the case of the circuit breaker surrounding the jaw, a block of conducting metal received within the jaw and partially received within the recess, an opening extending into the block disposed between two side walls of the block

and closely adjacent a third wall facing outwardly from the jaw, a bared end portion of a wire extending into the opening, and at least one indentation in the third side wall providing a protrusion extending into the opening and in interferring relation to the end portion of the wire.

3,874,768
INTEGRATED CIRCUIT CONNECTOR
John M. Cutchaw, 7333 E. Virginia, Scottsdale, Ariz. 85257
Filed Mar. 11, 1974, Ser. No. 449,966
Int. Cl. H05k *1/12*
U.S. Cl. 339—17 CF **10 Claims**



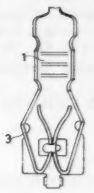
1. A connector for removably mounting a multilead integrated circuit to a printed wiring board and providing electrical interconnection between the leads of the integrated circuit and conductive elements of the circuit board, said connector comprising:

a. a housing for demountable attachment to the printed wiring board, said housing having a downwardly opening cavity formed therein into which the integrated circuit is nestingly positionable, said housing having downwardly facing bottom surfaces extending laterally from the opening of said cavity below at least an opposed pair of which the leads of the integrated circuit are transversely disposed when the integrated circuit is positioned within the cavity of said housing; and

b. a plurality of dual-contact spring elements dependingly suspended from at least each of the opposed pair of bottom surfaces of said housing for electrically contacting the leads of the integrated circuit and exerting a downwardly directed force thereon when the integrated circuit is positioned within the cavity of said housing, and for electrically contacting the conductive elements of the printed circuit board when said housing is mounted thereon.

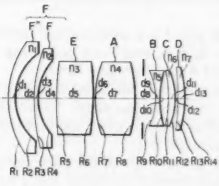
3,874,769
SPRING CONTACT FOR ESTABLISHING ELECTRIC PLUG-IN CONNECTIONS
Hans Simon, Bruchhausener Strasse, 5463 Unkel, Rhine, Germany
Filed Apr. 3, 1973, Ser. No. 347,569
Claims priority, application Germany, Apr. 4, 1972, 2216174
Int. Cl. H01r *9/00*
U.S. Cl. 339—217 S **13 Claims**

1. For use in establishing electrical connections, an electrically conductive body of unitary sheet material having a substantially flat base portion terminating at one end in a hook means for engaging a shoulder or the like of an insulating member, said body of sheet material having a pair of springy contact arms both of which have elongated fixed free end regions distant from said hook means, said fixed free end regions of said contact arms being integral with said base portion and bent at substantially right angles thereto, and said fixed free end regions of said contact arms diverging away from each other in a direction toward said hook means situating said fixed free end regions closest to each other at their extremities which are most distant from said hook means, and said springy contact arms respectively having elongated flexible portions separate from said base portion and extending from and beyond said fixed free end regions, said flexible portions having next to said fixed free end regions converging



regions which are inclined toward each other in a direction opposite to the direction of inclination of said fixed free end regions of said contact arms, and said flexible portions having beyond said converging regions thereof elongated movable free end regions bent toward each other backwardly with respect to said converging regions.

3,874,770
RETROFOCUS TYPE WIDE-ANGLE PHOTOGRAPHIC LENS
Yoshiyuki Shimizu, Kawasaki, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan
Filed May 31, 1973, Ser. No. 365,715
Claims priority, application Japan, June 7, 1972, 47-55975
Int. Cl. G02b *9/64*
U.S. Cl. 350—214 **7 Claims**



1. A retrofocus type wide-angle photographic lens system having a back-focus longer than the total focal length thereof, said system comprising, in the direction from the diaphragm toward the image side of said system, a biconcave lens component, a positive meniscus lens component having its concave surface facing the diaphragm, and a first positive lens component, and in the direction from the diaphragm toward the object side of said system, a biconvex lens component, a second positive lens component, and a negative meniscus lens member having its concave surface facing the diaphragm, said system satisfying the conditions:

i. that the center thickness of said second positive lens component is from approximately two times to approximately five times the center thickness of said negative meniscus lens member and is from approximately one hundred times to approximately one hundred sixty times the air spacing between said second positive lens component and said biconvex lens component;

ii. that the refractive power of the surface of said second positive lens component which is nearer to said diaphragm is less than the refractive power of the surface of said biconvex lens component which is remote from said diaphragm; and

iii. the surface of said second positive lens component which is remote from said diaphragm has a radius of curvature greater than the radius of curvature of an aplanatic sur-

face with respect to oblique rays passed through said negative meniscus lens member.

3,874,771

PHOTOGRAPHIC OBJECTIVE OF THE EXTENDED GAUSS TYPE

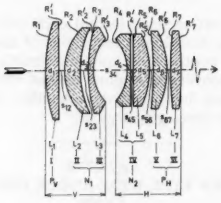
Karl-Heinrich Behrens, Konigsbronn, and Erhard Glatzel, Heidenheim, both of Germany, assignors to Carl Zeiss Stiftung d/b/a Carl Zeiss, Oberkochen, Germany

Filed June 25, 1973, Ser. No. 373,437

Claims priority, application Germany, June 30, 1972, 2232101

Int. Cl. G02b *9/00*

U.S. Cl. 350—214 **6 Claims**



1. A photographic objective of the extended Gauss type comprising seven lens elements arranged three in front of a stop space and four behind said stop space, the elements, as numbered consecutively from front to rear, and their relationship to each other, having substantially the characteristics set forth below:

Elements **1, 2,** and **3** are uncemented individual elements; Elements **1, 2, 5, 6,** and **7** are collecting lenses;

Elements **3** and **4** are diverging lenses;

The refractive power of the third surface (front surface of element **2**) is within the range limits of 1.55 and 3.50 times the refractive power of the first lens surface (front surface of element **1**);

The refractive power sum of the surfaces surrounding the second air lens formed by the air space between elements **2** and **3** (rear surface of element **2** and front surface of element **3**) is negative; and also

A_1. the surface refractive power sum of said second air lens according to its negative value is within the range limits of 0.323 and 0.543 times the equivalent refractive power of the entire objective;

A_2. the surface refractive power sum of the third air lens formed by the air space between elements **3** and **4** is also negative and is within the range limits of 12.50 and 8.090 times the refractive power of said second air lens;

B_1. the refractive power sum of the two lens surfaces surrounding the first air lens formed by the air space between elements **1** and **2** is within the range limits of 1,380 and 1.925 times the eequivalent refractive power of the entire objective;

B_2. the refractive power sum of the two lens surfaces surrounding the rearmost air lens formed by the air space between elements **6** and **7** is within the range limits of 1.285 and 1.805 times the equivalent refractive power of the entire objective;

B_3. the sum of the refractive power sums of said first air lens and said rearmost air lens is within the range limits of 2.665 and 3.730 times the equivalent refractive power of the entire objective; and

C. the quotient of the refractive power sum of said first air lens divided by the refractive power sum of said rearmost air lens is within the range limits of 1.310 and 0.944.

3,874,772

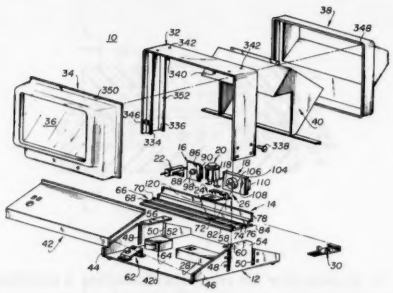
ADJUSTMENT MECHANISM FOR A LENS AND PRISM MOUNTED WITHIN A FILM VIEWER

William C. Kinsinger, New York; James Ippolito, Bronx, and Vincent Pisarri, Scarsdale, all of N.Y., assignors to Metagraphic Systems, Inc., Bronx, N.Y.

Division of Ser. No. 96,415, Dec. 9, 1970, Pat. No. 3,762,810, which is a continuation-in-part of Ser. No. 884,260, Dec. 11, 1969, Pat. No. 3,672,756. This application Sept. 24, 1973, Ser. No. 400,176

Int. Cl. G02b *7/02*

U.S. Cl. 350—247 **6 Claims**



1. A lens system for use in conjunction with film disposed on a film supporting member; said lens system comprising:

support bracket means for positioning said lens system with respect to said support member;

a prism; and

prism support means movably mounted with respect to said support bracket means for selective vertical and transverse movement of said prism with respect to said support member and for selective rotational movement of said prism with respect to an axis perpendicular to the plane of said support member.

3,874,773

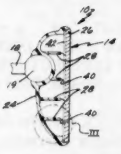
MIRROR CASE WITH EXPANSION-ABSORBING MEANS

Arthur W. Kurz, Jr., Birmingham, Mich., assignor to Donnelly Mirrors, Inc., Holland, Mich.

Filed Sept. 24, 1973, Ser. No. 399,961

Int. Cl. G02b *5/08*

U.S. Cl. 350—288 **19 Claims**



1. A mirror assembly for vehicles comprising a mirror case having a back, a front opening, and peripheral sides, and a mirror element received in said case in said front opening, said mirror element including generally planar front and back surfaces, a peripheral edge and a reflective coating on one surface thereof; retaining means for holding said mirror element in said case; said case including means for supporting at least a portion of said back of said mirror element and holding said element against said retaining means and a wall outlining said peripheral edge of said mirror element; said wall being

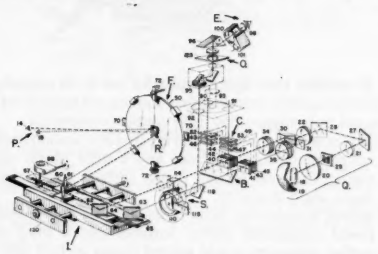
spaced outwardly from said mirror element edge along the entire length of said peripheral edge and including spaced, flexible fin means independent of said retaining and supporting means extending inwardly from said wall and generally normal thereto toward said peripheral edge from generally opposing portions of said wall for preventing movement of said mirror element in said case and for accommodating change in said spacing between said wall and mirror element peripheral edge due to temperature changes.

3,874,774

EYE TEST APPARATUS

William E. Humphrey, Oakland, Calif., assignor to Humphrey Research Associates, Inc., Oakland, Calif.

Filed June 20, 1973, Ser. No. 371,809
Int. Cl. A61b *3/02*
U.S. Cl. 351—26 **27 Claims**



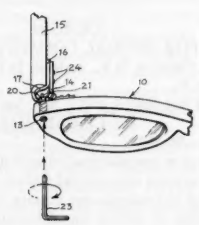
1. An eye testing device comprising: a patient viewing station; a projector; at least one light path between said patient viewing station and said projector; said projector including at least one target for projection and projecting optics for projecting at least one image to be viewed by a patient at a distance removed from said patient along said light path; corrective optics for emulating said patient's opthalmological prescription for placement in said light path at a location between said projecting optics and said patient; focusing optics of preselected focal length removed by a distance greater than said focal length from said corrective optics toward said patient for focusing a real image of said corrective optics to the optical position of said patient's ophthalmological prescription proximate said patient's eye.

3,874,775

SPECTACLE FRAME WITH TEMPLES ANGULARLY ADJUSTABLE WHILE SPECTACLE FRAME IS WORN ON HEAD

Harry J. Lazarus, 36 Knox Ln., Englishtown, N.J. 07726

Filed June 1, 1973, Ser. No. 366,202
Int. Cl. G02c *5/04*
U.S. Cl. 351—41 **20 Claims**



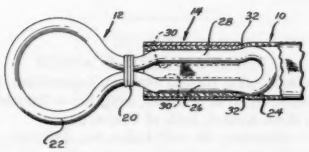
1. A spectacle frame comprising, in combination, a frontal lens support including a nose bridge; a pair of temples; respective hinges connecting each temple to a respective outer end of said lens support; and adjustment means, accessible externally of said spectacle frame while said spectacle frame is being worn on the head, interengaged between at least one temple and said lens support and operable to adjust and set the temple angularly about the axis of the associated hinge to adjust the pressure of the temple against the wearer's head; said adjustment means comprising a threaded member threadedly engaged in said lens support and having an end operatively engaged with said temple at a point spaced from the axis of the associated hinge; and an operating member, accessible from the front surface of said lens support while said spectacle frame is being worn on the head, operable to advance and retract said threaded member relative to said lens support.

3,874,776

RETAINER FOR EYEGLASSES

Suren V. Seron, Joliet, Ill., assignor to Seron Manufacturing Company, Joilet, Ill.

Filed Apr. 26, 1973, Ser. No. 354,528
Int. Cl. G02c *5/00*
U.S. Cl. 351—123 **5 Claims**



1. An eyeglass retainer, comprising
an elongated, flexible strap;
a continuous ring formed of resilient material; and
a ferrule crimped about an end of said strap and opposite sides of said ring such that a large loop and a small loop of the ring emerge from the ferrule, the opposite sides of the ring within the ferrule being generally parallel and the diameter of said small loop being greater than the distance between said parallel opposite sides to assist in maintaining said retainer in assembled relation, and said large loop being adapted to receive the temple of an eyeglass.

3,874,777

MULTIFOCAL LENS BLANKS

Emil W. Deeg, Woodstock, Conn.; Bradford Canterbury, and Arnold J. Simpson, both of Southbridge, Mass., assignors to American Optical Corporation, Southbridge, Mass.

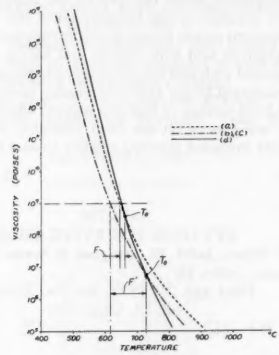
Filed Apr. 26, 1973, Ser. No. 354,599
Int. Cl. G02c *7/06;* **C03b** *11/08*
U.S. Cl. 351—168 **4 Claims**

1. A multifocal lens blank comprised of the fused combination of a major portion of low refractive index optical glass and a segment portion of a relatively high refractive index optical glass wherein the improvement comprises;

said segment portion glass having a refractive index within the range of from 1.54 to 1.70 and viscosity $\eta_s(T)$ as a function of a temperature T;

said major portion glass having a refractive index within the range of from 1.50 to 1.55 and viscosity $\eta_m(T)$ as a function of a temperature T with 10^5 $\eta_m(T_o)=\eta_s(T_o)$ 10^9 poises for a cross-over temperature T_o and $\eta_m(T)<\eta_s(T)$

for $T<T_o$ and $\eta_m(T)$ $\eta_s(T)$ for $T>T_o$; and fusion strain in segment glass of said fused combination



being less than 25 nm/cm tension and 75 nm/cm compression.

3,874,778

ROTARY MIRROR SCANNER

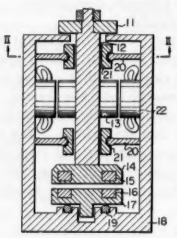
Shigeo Kato, Mitaka; Hitoshi Masuko, Sagamihara, and Yukio Kameyama, Hino, all of Japan, assignors to Hitachi, Ltd. and Nippon Hoso Kyokai, both of Tokyo, Japan

Filed Dec. 26, 1973, Ser. No. 428,008

Claims priority, application Japan, Dec. 27, 1972, 47-129795

Int. Cl. G02b *17/00*

U.S. Cl. 350—7 **4 Claims**



1. A rotary mirror scanner comprising a rotary shaft having affixed to one portion thereof a rotary mirror comprising at least one mirror surface capable of deflecting in a predetermined direction a light beam incident thereon from one direction, a plurality of dynamic gas journal bearings each being disposed in a position for supporting said rotary shaft and adapted dynamically to increase the pressure of air surrounding the rotary shaft as the number of revolution of the rotary shaft increases so as to support the rotary shaft by radially exerting thereon a centripetal force, a repulsion type thrust bearing disposed in a position for axially supporting said rotary shaft and adapted to support the same by causing the same to float axially by the magnetic force of repulsion, and a drive disposed in the vicinity of said rotary shaft in a position other than the positions in which said rotary mirror, said dynamic gas journal bearings and said repulsion type magnetic thrust bearing are disposed so as to rotate the rotary shaft by the revolving magnetic field produced in the vicinity of the magnetic field.

3,874,779

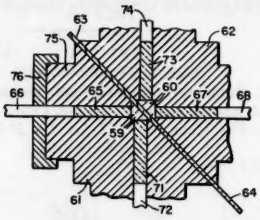
VARIABLE RATIO LIGHT COUPLER

Frank L. Thiel, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed July 5, 1973, Ser. No. 376,578

Int. Cl. G02b *5/14*

U.S. Cl. 350—96 WG **18 Claims**



1. A variable ratio light coupler for use in an optical communication system including first and second sections of optical signal transmission line, said coupler comprising

a first transparent member having first and second opposed, nonparallel planar surfaces and a third planar surface intersecting said second planar surface and making an acute angle therewith,

a second transparent member having first and second opposed nonparallel planar surfaces and a third planar surface intersecting said second planar surface and making an acute angle therewith, said second surface of said second member being parallel to and slightly spaced from said second surface of said first member,

a layer of transparent material disposed between said first and second members, the refractive index of said layer being less than that of said first and second members,

first coupling means disposed adjacent to said first surface of said first member, said first coupling means being adapted to couple light from said first section of optical signal transmission line into said first member, the longitudinal axis of said first section of transmission line making an angle other than 90° with said second surface of said first member,

output means for receiving that light which reflects from the interface between said first member and said layer,

second coupling means disposed adjacent to said third surface of said first member for coupling light between said first member and said output means,

third coupling means disposed adjacent to said first surface of said second member for coupling light from said second member into said second section of optical signal transmission line, and

means for changing the material of said layer, thereby changing the refractive index of the medium between said first and second members.

3,874,780

COUPLER FOR OPTICAL COMMUNICATION SYSTEM

Roy E. Love, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed July 5, 1973, Ser. No. 376,576

Int. Cl. G02b *5/14*

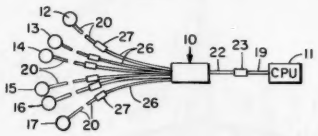
U.S. Cl. 350—96 WG **11 Claims**

1. In an optical communication system having a plurality of stations and at least one control station, each of said stations being adapted to transmit and receive optical signals, a coupler, a plurality of optical signal transmission lines for connecting said plurality of stations to said coupler, at least one other optical signal transmission line for connecting said at least one control station to said coupler, each of said transmission lines comprising at least one optical waveguide having a core of transparent material having a refractive index n_1 sur-

rounded by a layer of transparent cladding material having a refractive index n_2 that is lower than n_1, said coupler being adapted to couple optical signals from said first plurality of transmission lines to said at least one transmission line and couple optical signals from said at least one transmission line to said plurality of transmission lines but prevent the coupling of optical signals from one to another of said plurality of transmission lines, said coupler comprising

an elongated cylindrically shaped rod of transparent material of refractive index n_3 having first and second planar endfaces that are substantially perpendicular to the axis thereof,

means surrounding said rod for forming with the surface thereof an optical quality light reflecting interface,



first support means for disposing the ends of said plurality of transmission lines in a bundled parallel arrangement, the optical waveguides of which said transmission lines are comprised terminating in faces that are disposed adjacent to said first endface, said faces being disposed in a planar array that is substantially parallel to said first endface,

second support means for disposing the end of said at least one transmission line adjacent to said second endface, the axis of said at least one transmission line being substantially parallel to that of said rod, and

means at said first and second endfaces for preventing light from said rod from reflecting from said endfaces back into said rod.

3,874,781

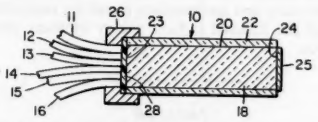
COUPLER FOR OPTICAL COMMUNICATION SYSTEM

Frank L. Thiel, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed July 5, 1973, Ser. No. 376,581

Int. Cl. G02b *5/14*

U.S. Cl. 350—96 C **10 Claims**



1. In an optical communication system having at least three optical signal transmission lines each comprising at least one optical waveguide having a core of transparent material having a refractive index n_1 surrounded by a layer of transparent cladding material having a refractive index n_2 that is lower than n_1, a coupler for coupling the signal in any one of said optical transmission lines to all of the remaining optical transmission lines, said coupler comprising

an elongated rod of transparent material of refractive index n_3 having an outer side surface and first and second planar endfaces that are substantially perpendicular to the longitudinal axis thereof, the length L of said rod satisfying the equation

$$L \geq d/2 \tan \theta_c$$

where d is the diameter of said rod and the angle θ_c is the acceptance half angle of said at least one optical waveguide,

means surrounding said rod and cooperating with said outer side surface thereof for forming an interface for reflecting back into said rod light from said transmission lines that impinges upon said side surface,

means disposed on said second endface for reflecting light, the wavelength of which is to be transmitted by said optical signal transmission lines, and

support means for disposing the ends of said optical signal transmission lines in a bundled, parallel arrangement, the optical waveguides of which said transmission lines are comprised terminating in faces that are disposed in a substantially planar array adjacent to said first endface.

3,874,782

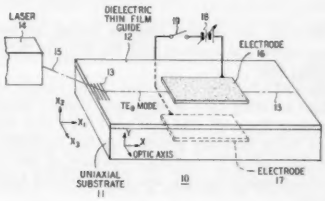
LIGHT-GUIDING SWITCH, MODULATOR AND DEFLECTOR EMPLOYING ANTISOTROPIC SUBSTRATE

Ronald Vernon Schmidt, Matawan, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 1, 1973, Ser. No. 402,469

Int. Cl. G02b *5/14*

U.S. Cl. 350—96 WG **10 Claims**



1. An optical device of the type comprising a transparent substrate having first and second substantially flat, opposing major surfaces, a body of transparent material disposed on the first major surface of said substrate having a thickness so as to be capable of guiding a wave of optical electromagnetic radiation within that dimension, and means for launching a wave of optical electromagnetic radiation into a guided mode in said body to propagate substantially parallel to the first major surface of said substrate, said device being characterized in that said substrate is formed of an anisotropic crystalline material having an optic axis, a first index of refraction for a wave with electric vector polarized parallel to the optic axis and a second index of refraction for a wave with electric vector polarized normal to the optic axis, the thickness and refractive index of said waveguiding body and the orientation of the optic axis of said substrate with respect to the first major surface being selected so that said body supports as a guided wave one polarization of said wave but not the other, orthogonal polarization of said wave, said device being further characterized by means for interacting with said anisotropic substrate to couple at least a portion of said guided wave from the supported polarization to the unsupported polarization in said waveguiding body, said coupled portion of said wave propagating immediately out of said body into said substrate.

3,874,783

NUMERICAL APERTURE EXPANSION IN FIBER OPTIC DEVICES

Henry B. Cole, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.

Continuation of Ser. No. 277,702, Aug. 2, 1972, abandoned. This application Mar. 8, 1974, Ser. No. 449,320

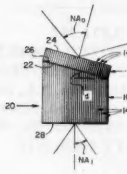
Int. Cl. G02b *5/16*

U.S. Cl. 350—96 B **5 Claims**

1. A fiber optic device having light-receiving and light-emitting oppositely disposed faces, one face having a different numerical aperture than the other, said device comprising:

a coupled together pair of bundles of tightly juxtapositioned light-conducting fibers, the fibers of each of said bundles

individually comprising a core of high refractive index material and a cladding of material having a lower index of refraction than said core wherewith opposite end faces of said fibers are individually provided with a numerical aperture determined by the difference in refractive index between said core and cladding and said end faces in each of said bundles collectively providing the respective bundle faces with corresponding numerical apertures;



the fibers of one of said bundles having an appreciably larger numerical aperture than the fibers of the remaining bundle; and

the plane of a light-receiving face of one bundle and that of a light emitting face of the other bundle cutting corresponding fibers of said pair on a bias and said biasing faces being optically joined together to further expand said differential of numerical aperture of said oppositely disposed light-receiving and light-emitting faces of said device.

3,874,784

SIGNAL REFLECTOR WITH CONVEX REFLECTORS SECURED TO A TRANSPARENT SPHERE

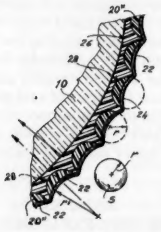
Ludwig Eigenmann, Vacallo Ticino, Switzerland

Filed June 15, 1973, Ser. No. 370,538

Claims priority, application Italy, June 17, 1972, 25845/72; July 1, 1972, 26499/72

Int. Cl. G02b *5/12*

U.S. Cl. 350—109 **4 Claims**



1. As a new article of manufacture, an improved catoptrically behaving retro-reflecting system, which includes a main transparent sphere designed to have an uncoated spherical portion positioned for light impingement, a transparent coating, and closely spaced shallow spherical recesses in said coating, the radii of curvature of said recesses being greater than half of the inter-axial interval between said recesses, and reflective means on the outer surface of said shallow spherical recesses.

3,874,785

OPTICAL DEFLECTOR ARRANGEMENT FOR USE IN HOLOGRAPHIC DATA STORAGE DEVICES

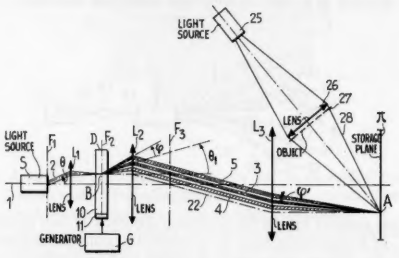
Jean Pierre Huignard, Paris, France, assignor to Thomson-CSF, Paris, France

Filed May 29, 1973, Ser. No. 364,758

Claims priority, application France, June 2, 1972, 72.19939

Int. Cl. G02b *27/38*

U.S. Cl. 350—161 **4 Claims**



1. An optical deflector for electrically steering and focusing a collimated beam of light into a selected area in a predetermined plane having a plurality of selectable areas and at a selected angle of incidence said optical deflector comprising: means for producing a collimated beam of light and for selectively deflecting said beam in one of a plurality of angular directions so as to control the particular area selected in said predetermined plane, a telecentric lens positioned for receiving said collimated beam, said beam having an axis that passes through the front focal point of said telecentric lens, an intermediate lens having an anterior focal plane coincident with the rear focal plane of said telecentric lens, a projection lens having its rear focal plane coincident with said predetermined plane for focusing onto said selected area the light emerging from said intermediate lens, and electrically controllable optical deflector means positioned in said coincident focal planes of said telecentric and intermediate lenses for controlling the direction of the focused radiant energy incident onto said selected area.

3,874,786

ELECTRO-STATIC CONTAMINANT REMOVAL FROM LIGHT MODULATING FLUID

Howard E. Towlson, Baldwinsville, N.Y., assignor to General Electric Company, Suracuse, N.Y.

Filed Sept. 10, 1973, Ser. No. 395,514

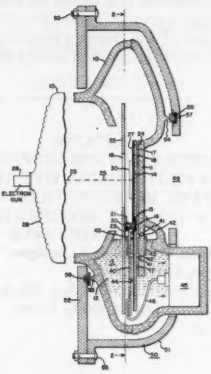
Int. Cl. G02f *1/32;* **B01d** *13/02*

U.S. Cl. 350—161 **11 Claims**

1. In a light valve containing a rotatable disk on which a layer of light-modulating fluid is carried, a portion of said disk being submerged in a reservoir of said fluid, said light valve including an output window partially submerged in said reservoir such that a portion of said fluid is contained between said disk and said output window, apparatus for removing contaminants from said fluid comprising:

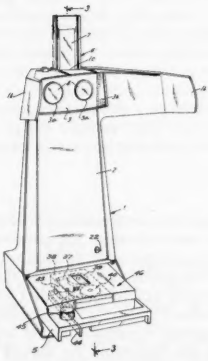
means for applying a dc voltage of cyclically reversing polarity across said portion of said fluid, said voltage being of sufficiently high amplitude electrostatically to move particulate matter away from said disk and said output window; and

means for withdrawing fluid containing said particulate matter from said reservoir and replenishing said reservoir



with fluid in which the content of particulate matter has been minimized.

3,874,787
AUDIO VISUAL DEVICE
Stanford E. Taylor, Hawk Dr., Lloyd Harbor, N.Y. 11743
Filed Apr. 24, 1973, Ser. No. 354,012
Int. Cl. G03b *31/06, 23/12*
U.S. Cl. 353—15 **2 Claims**



1. An audio visual device for viewing pictures, symbols, reading material and like material synchronized with sound comprising:

a housing having audio and viewing passageways therein;

a lens system in the housing aligned with the material to be viewed;

support means and a gravity feed advance mechanism in said housing positioned to engage with visual material introduced to said housing and to advance said visual material automatically in a predetermined manner;

audio means in said housing adapted to receive and transmit an audio program;

a power source associated with said housing;

audio control means in said housing responsive to said power source to operate said audio receiving means;

visual control means responsive to predetermined audio signals from the audio means to automatically activate said advance mechanism to advance the visual material under the force of gravity in synchronization with the audio program;

a drive motor being in the housing connected to the power source;

a tape containing an audio program and a number of spaced audio signals thereon;

drive means connected to the drive motor to receive an audio programmed tape and drive said tape;

an audio pick-up head in said housing and adapted to be brought into engagement with the tape so that the audio program and the audio signals can be picked up by said head;

a first two-stage amplifier system connected to said pick-up head to amplify the audio program and the audio signals; filter means in said first two-stage amplifier to separate the audio signals from the audio program;

a speaker connected to the first two-stage audio amplifier to receive the audio program therefrom and transmit the program to the listener;

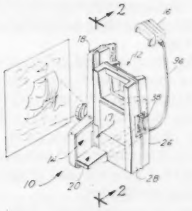
a rectifier connected to the first two-stage amplifier to receive the filtered audio signals and to rectify the signals; a second two-stage amplifier connected to the rectifier to amplify the rectifier audio signals;

a relay connected to the second two-stage amplifier and to a solenoid with the solenoid being connected to the advance mechanism for the visual material so that when an amplified audio signal is received by the relay, the solenoid will be actuated to advance the visual material in a predetermined manner;

a time delaying amplifier connected to said relay and responsive to an audio signal of predetermined length to receive that signal and activate a second relay which opens a switch between the power source and the motor, stopping operation of the device; and

the switch adapted to be manually closed to restart the device upon demand.

3,874,788
SLIDE CHANGING MECHANISM
Herbert Thorn, Jamaica, and Harvey Berkin, Merrick, both of N.Y., assignors to Ideal Toy Corporation, Hollis, N.Y.
Filed Sept. 24, 1973, Ser. No. 400,455
Int. Cl. G03b *23/02*
U.S. Cl. 353—111 **19 Claims**



1. A slide projector comprising a housing having a projection opening therein, means in said housing for directing light through said opening, rack means for supporting a vertical column of slides in edge to edge relation above said projection opening and from which individual slides may fall into position in alignment with said opening for projection; and slide transport means for receiving and supporting the lowermost slide in said stack at said position in alignment with said projection opening and for selectively removing said lowermost slide from said position in alignment with said opening to a discharge position while simultaneously supporting the remain-

der of the slides in the stack in said rack means; said slide transport means comprising a relatively flat plate slidably mounted in said housing for movement between first and second positions in a path of travel located directly below said rack means and adjacent said projection opening, said plate having an upwardly opening recess formed therein located adjacent one end of the plate in position to be below said rack means in the first position of said plate thereby to receive the lowermost slide in the rack as the lowermost slide falls into the recess; and said plate including an upper edge portion extending from said recess towards the other end of said plate, said upper edge portion of said plate supporting thereon the next slide in said rack as said plate is moved between said first and second positions thereby preventing downward movement of the slides in said rack until the plate is in said first position with said recess located below said rack means.

3,874,789

APPARATUS FOR READING AND ELECTROPHOTOGRAPHIC REPRODUCTION OF MICROPHOTOGRAPHS

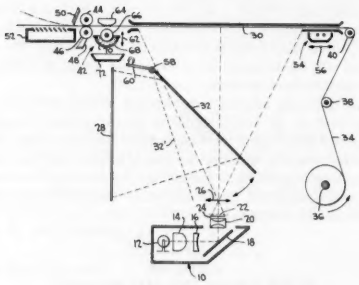
Guy Paul Weber, Arques la Bataille, France, assignor to La Cellophane, Paris, France

Filed Apr. 20, 1973, Ser. No. 353,104

Claims priority, application France, Apr. 20, 1972, 72.13899

Int. Cl. G03g *15/00*

U.S. Cl. 355—5 **9 Claims**



8. Apparatus for reading and electrophotographic reproduction of microphotographs comprising:

a roll of copy paper;

an exposure station having an exposure plane for receiving a light image of a microphotograph to be reproduced;

a developing station including a member for applying toner to said copy paper;

cutting means for severing said copy paper;

drive means for moving said copy paper from said roll through said exposure station and said developing station; charging means movable back and forth along said exposure plane to charge said copy paper at said exposure station wherein said charging means includes a high voltage source having positive and negative terminals and corona-charging electrodes;

an optical system for transmitting a light image of a microphotograph to said exposure plane or said screen, said optical system including a mirror pivotal between a reading position where said light image is transmitted to said screen and a reproduction position where said light image is transmitted to said exposure plane; and

control means for operating said drive means, said charging means and said mirror to move said copy paper to said exposure station prior to movement of said charging means and to move said mirror from said reading position to said reproduction position, said control means including means for changing the polarity of said charging means during movement along said exposure plane to permit positive and negative charging of said copy paper, wherein said means for changing the polarity of said charging means includes switch means selectively connecting said corona-charging electrodes to said positive terminal or said negative terminal of said high voltage source and wherein said means for changing the polarity of said charging means further includes a switch actuated by movement of said charging means along said exposure plane to control the position of said switch.

3,874,790

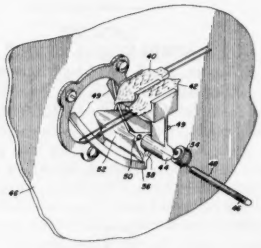
FAIL-SAFE MECHANISM FOR STOPPING MOVEMENT OF THE PHOTOCONDUCTIVE BELT IN AN ELECTROSTATIC REPRODUCTION MACHINE WHEN TRACKING OF THE BELT BECOMES IRREGULAR AND UNCONTROLLABLE

William E. Jordan, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 23, 1973, Ser. No. 418,718

Int. Cl. G03g *15/00*

U.S. Cl. 355—16 **2 Claims**



1. An improved electrostatic reproduction machine having framework, and an endless belt assembly mounted for movement between an operative position within the framework to an inoperative position remote from the framework, the belt assembly having a plurality of rollers adapted to support and move an endless belt having a photoconductive areas thereon, the improvement comprising means including switch means mounted to the framework for sensing a lateral deviation of the belt from its normal course of movement during operation and for opening a circuit in response to sensing a predetermined deviation, the sensing means having means for converting the lateral movement of the belt into rotational movement in effecting the opening of the circuit, means for adjusting the position of the switch means with respect to the belt assembly comprising a first member mounted so as to be movable with respect to the remainder of the sensing means, means for indicating the position of the first member with respect to the remainder of the sensing means after the belt assembly has been moved into its operative position, and means for adjusting the position of the switch means to correspond to the position of the first member after the belt has been moved into its inoperative position.

3,874,791
PHOTOGRAPHIC PRINTER WITH AUTOMATIC POSITIONING CONTROL

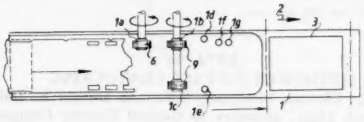
Hans Thieme, Unterhaching; Friedrich Hujer, Grunwald, and Harald Fengler, Taufkirchen near Munich, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Sept. 19, 1973, Ser. No. 398,771

Claims priority, application Germany, Sept. 20, 1972, 2246066

Int. Cl. G03b *27/46*

U.S. Cl. 355—41 **13 Claims**



1. In a photographic arrangement for copying originals arranged on elongated signal carrier means, said elongated signal carrier means also having a plurality of marks each arranged in a predetermined position relative to a corresponding one of said originals, said photographic arrangement having transport means for transporting said elongated signal carrier means along a predetermined path past a printing station, in combination, scanning means arranged a predetermined distance before said printing station in the direction of transport of said elongated signal carrier means, for scanning said predetermined portion of said elongated signal carrier means and furnishing a mark signal in response to each of said marks; distance measuring means coupled to said transport means for furnishing distance signals, each indicative of a predetermined incremental length of transport of said elongated signal carrier means along said predetermined path; and bistable circuit means connected to said scanning means and said distance measuring means and operative only upon receipt of one of said mark signals, for furnishing a stop signal for stopping said transport means following receipt of a plurality of said distance signals together signifying said predetermined distance between said scanning means and said printing station.

3,874,792
LAMP HOUSING FOR USE IN PHOTOGRAPHIC ENLARGERS OR THE LIKE

James Turner, Harrow, England, assignor to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

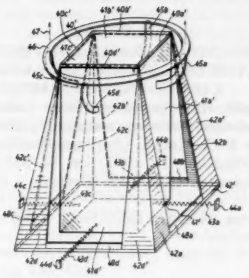
Filed Aug. 1, 1973, Ser. No. 384,398

Claims priority, application Germany, Aug. 8, 1972, 2238944

Int. Cl. G03b *27/54*

U.S. Cl. 355—67 **16 Claims**

1. In a lamp housing, particularly for use in photographic projection printers, a light confining and guiding device comprising a plurality of walls movable between first positions in which said device constitutes a first light duct in the form of a first hollow truncated pyramid with spaced apart top and base planes and contiguous sides which confine light that enters said first duct by passing across one of said planes and issues from said first duct by passing across the other of said planes, and at least one second position in which said device constitutes a different second light duct having the form of a second hollow truncated pyramid with spaced apart top and base planes and contiguous sides the area of at least one of



said planes of said second pyramid being different in size from the area of the corresponding plane of said first pyramid.

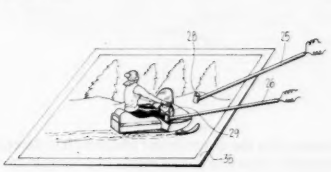
3,874,793
ELECTRONIC PRINT EXPOSURE ANALYZER

Philip D. Nielsen, 9328 Chalk Hill Rd., Healdsburg, Calif. 95448

Filed Apr. 9, 1973, Ser. No. 349,352

Int. Cl. G03b *27/74*

U.S. Cl. 355—68 **8 Claims**



1. An electronic print exposure analyzer for providing a paper grade index and for automatically controlling the duration of an exposure time interval during the reproduction of a projected image, said analyzer comprising:

means for providing a pair of contemporary control signals representative of the contrast range of said projected image, said means comprising first and second photosensitive elements, said first photosensitive element adapted to be arranged in the brightest portion of said projected image and said second photosensitive element adapted to be arranged in the darkest portion of said projected image,

a measuring circuit coupled to said signal providing means for generating a signal representative of said paper grade index, said measuring circuit including a visible indicator and switch means for coupling said photosensitive devices in parallel to said visible indicator when in a balance adjust position and for coupling one of said photosensitive devices to said visible indicator when in a paper grade index position; input terminal means adapted to be coupled to a source of enabling voltage; a first pair of enabling voltage output terminals adapted to be coupled to an image exposure lamp and exposure time control circuit for controlling the coupling of said enabling voltage input terminal means to said first pair of enabling voltage output terminals

an adjustable resistance device for enabling manual adjustment of said measuring circuit to a balance condition indicated by said visible indicator, the setting of said adjustable resistance device after said balance condition is attained providing a control parameter for establishing the duration of the exposure time interval; and

coupling means for alternately coupling said adjustable resistance device to said measuring circuit and said exposure time control circuit.

3,874,794

METHOD AND APPARATUS FOR PHOTOMETRIC ANALYSIS OF SUBSTANTIALLY COLORLESS COMPONENTS OF SAMPLE

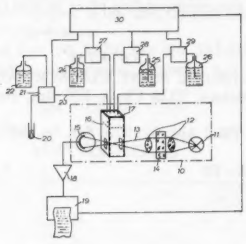
Albert Schmitt; Hans Vogel, and Toma Tomoff, all of Uberl Ingen, Bodensee, Germany, assignors to Bodenseewerk Perkin-Elmer & Co. GmbH, Uberlingen/Bodensee, Germany

Filed Apr. 20, 1973, Ser. No. 352,887

Claims priority, application Germany, Apr. 21, 1972, 2219552

Int. Cl. G01n *1/00, 33/16;* **G01j** *3/48*

U.S. Cl. 356—36 **6 Claims**



1. A method for the quantitative photometric determination of substantially colorless components of a sample by reaction with a color-producing reagent and subsequent determination of the absorbance of the colored reaction product at a specific wavelength, comprising

as a first group of steps, introducing a metered sample volume into a cell (17) and dilution by a metered quantity of a diluent and after intimate mixing a first optical transmission value corresponding to the blank value is measured;

and as a second group of steps, a metered quantity of a color-producing reagent is added to the sample and diluent and after intimate mixing a second optical transmission value is measured.

3,874,795

SMOKE DETECTOR

David Roy Packham, Upper Beaconsfield, Victoria, and Leonard Gibson, Frankston, Victoria, both of Australia, assignors to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia and The Commonwealth of Australia, Melbourne, Victoria, Australia

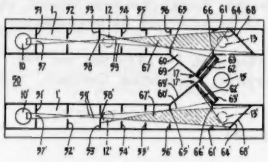
Filed June 5, 1973, Ser. No. 367,260

Claims priority, application Australia, June 6, 1972, 9230/72

Int. Cl. G01m *21/00, 21/12*

U.S. Cl. 356—104 **20 Claims**

1. A smoke monitoring instrument having first and second chambers, each with a respective photodetector means, a light source common to both chambers and positioned to simultaneously illuminate part of the interior of each chamber, means for conveying a first air sample from the space to be monitored into said part of the first chamber, means for conveying a second air sample from outside the space into said part of the second chamber, each photodetector means being arranged to simultaneously receive light from the source which



is scattered by its respective air sample but not to receive light directly from the source.

3,874,796

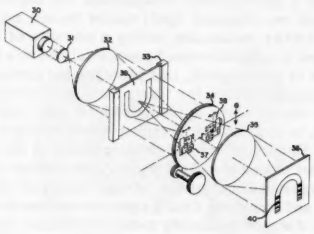
METHOD OF SURFACE CONTOURING

Joseph L. Chovan, Liverpool, N.Y., and Donald E. Duffy, Edmond, Okla., assignors to General Electric Company, Syracuse, N.Y.

Filed May 25, 1973, Ser. No. 363,975

Int. Cl. G01b *9/02*

U.S. Cl. 356—109 **6 Claims**



1. The method of surface contouring, comprising:

a. imaging an observed object under conditions of illumination providing appreciable surface detail at spatial frequencies suitable for resolving the orthogonal surface displacements to be sensed,

b. recording two correlatable images of said object between which surface elements of said object are displaced relative to the observer in a direction orthogonal to the direction of observation as a result of a change in relative viewing position parallel to said orthogonal direction,

c. simultaneously superimposing elements of said images without relative rotation upon a transparency with elements at a predetermined distance from the observer coincident,

d. illuminating said transparency by a narrow spectral band light source, and

e. imaging said transparency through a narrow band spatial filter positioned to form an interference pattern of equal depth contours.

3,874,797

ELLIPSOMETER

Toshiyuki Kasai, Kawasaki, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Apr. 5, 1974, Ser. No. 458,426

Claims priority, application Japan, Apr. 13, 1973, 47-41357

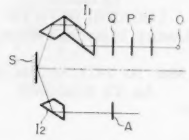
Int. Cl. G01n *21/40*

U.S. Cl. 356—118 **4 Claims**

1. An ellipsometer for measuring the thickness, optical constant or the like of a sample from the polarization with which light impinging on the surface of the sample is reflected therefrom, said ellipsometer comprising:

a polarizing optical system disposed on an optical axis substantially perpendicular to the surface of the sample to be measured and for providing an emergence of elliptical polarized light;

a first optical path changing total reflection prism for imparting a phase skip difference to the elliptical polarized light emergent from said polarizing optical system and for totally reflecting said polarized light to deflect the path thereof to cause it to impinge obliquely on said sample surface;



a second optical path changing total reflection prism for imparting a phase skip difference to said light reflected by said surface of the sample and for totally reflecting said reflected light to deflect the path thereof to cause it to be substantially parallel to the optical axis of said polarizing optical system; and

an analyzer for extinguishing the light passed through said second total reflection prism.

3,874,798

METHOD AND APPARATUS FOR CONTACTLESS MEASURING OF AN OBJECT USING SEPARATE OPTOLECTRICAL DEVICES FOR RESPECTIVE BORDERS OF OBJECT

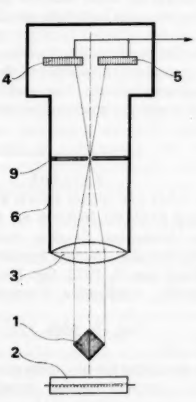
Leif-Goran Antonsson, Fagersta; Joel Karl Gosta Redlund, Norberg, and Karl Yngve Kjell Rosengren, Fagersta, all of Sweden, assignors to AGA AB, Agavagen, Lidingo, Sweden

Filed June 6, 1973, Ser. No. 367,648

Claims priority, application Sweden, July 3, 1972, 8692/72

Int. Cl. G01b *11/04, 11/10*

U.S. Cl. 356—159 **12 Claims**



7. Apparatus for contactless measuring of a dimension of a movable object comprising:

at least a pair of opto-electrical devices, each of which is comprised of an array of light sensitive elements;

projecting means for projecting respective opposite borders of an optical image of the movable object in one dimension upon a separate one of said opto-electrical devices;

scanning means for successively scanning the luminous intensity of said light sensitive elements of said pair of opto-electrical devices at a predetemined repetition rate, the scanning being performed with simultaneous start from that end of each opto-electrical device which is covered or shadowed by the image of the object;

means for detecting the illuminated and shadowed out light sensitive elements for registering the relative positions of the border of the object; and

means responsive to said detecting and registering means for determining the dimension of the object.

3,874,799

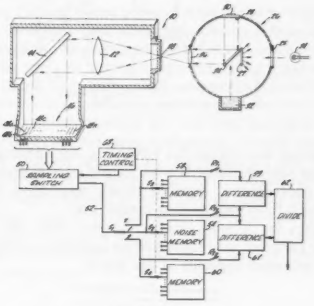
METHOD AND APPARATUS FOR COLOR SPECTROPHOTOMETRY

David Isaacs, Tustin; David L. Fried, Yorba Linda, and George A. Ameer, Santa Ana, all of Calif., assignors to Color Control, Inc., Santa Ana, Calif.

Filed June 1, 1973, Ser. No. 366,090

Int. Cl. G01j *3/46, 3/34*

U.S. Cl. 356—173 **45 Claims**



1. The method of making color measurements comprising the steps of

impinging light from a light source upon a standard and a sample,

collecting light from said light source that is transmitted along at least one optical collection path from said standard and from said sample,

generatiing first and second signals indicative of collected light transmitted from said standard and sample respectively,

generating a noise signal indicative of stray light included in said collected light,

said stray light including light in said optical collection path derived from said source, and

differentially combining said noise signal with each of said first and second signals so as to yeild third and fourth signals indicative of light transmitted from said standard and sample respectively as corrected for the presence of stray light.

3,874,800

APPARATUS FOR DETECTING LIQUID POLLUTION IN A TRANSPARENT CONTAINER

Dierick Kossel, Braunfels, Germany, assignor to Ernst Leitz GmbH, Wetzlar, Germany

Filed Nov. 27, 1973, Ser. No. 419,429

Claims priority, application Germany, Dec. 12, 1972, 2260602

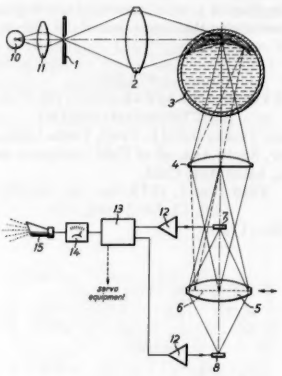
Int. Cl. G01n *21/06, 21/26*

U.S. Cl. 356—208 **10 Claims**

1. Apparatus for detecting the presence of pollutant particles in transparent or translucent liquid in a container pro-

vided with at least one transparent or translucent wall portion, the apparatus comprising:

a. means for causing the liquid to move relative to the stationary container;
b. means for illuminating a zone in the liquid contained in the container;
c. optical grating means whereon said illuminated zone is imaged;



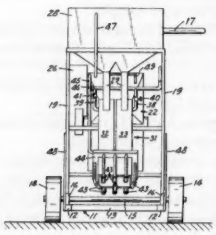
d. optical lens means for refracting the imaging light rays from said illuminated zone to said optical grating means;
e. photoelectric receiver means responsive to light received from said grating means; and
f. means for deriving electrical signals from the photoelectric receiver, said signals being indicative of the presence of pollutent particles in the liquid.

3,874,801

APPARATUS FOR MARKING PAVED SURFACES

Lyall B. White, Sun City Center, Fla., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 13, 1973, Ser. No. 350,710
Int. Cl. A47l *13/32*
U.S. Cl. 401—2 **8 Claims**



1. Apparatus for applying a fusible organic-based particulate marking material to paved surfaces to form instantly traffic-bearing markings on the paved surfaces, comprising a frame supported by wheels and, mounted on the frame,

1. forced air means,
2. chute means connected to the forced air means and directed toward a paved surface over which the apparatus is moved;
3. a set of kindling nozzles disposed circumferentially around the end of the chute means and connected to the forced air means;
4. container means for particulate marking material disposed above said chute means and connected through metering means to said chute means so as to supply particulate marking material to said chute means; and
5. gaseous fuel means comprising a supply tank and conduit means connected between the supply tank and the chute means and the set of kindling nozzles so as to introduce gaseous fuel into the air stream moving through the chute means and kindling nozzles;

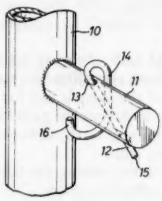
the forced air means supplying air through the chute means at a velocity such that a flame ignited at the end of the chute means is spaced from the end of the chute means.

3,874,802

LOCKING DEVICES

Edward George Lindsey, Ubley Park House, Chen Stoke, Bristol, England

Filed Mar. 30, 1973, Ser. No. 346,434
Int. Cl. F16d *3/08*
U.S. Cl. 403—49 **8 Claims**



1. A locking device adapted to secure a member thereon, comprising a peg member and an elongate latch member, said peg member including an aperture providing longitudinally and obliquely extending sliding means through said peg member, said latch member including upper stop means; said latch member being slidably mounted in said aperture and having a constrained movement longitudinally and obliquely in said peg member between a first securing and a second retracted position, said first position permitting said latch member to project on both sides of said peg member, and said second position permitting the latch member to project on only one side of said peg member, whereby another member having a receiving aperture is adapted to receive said peg member and said other member is adapted to be secured on said peg member by said constrained movement of the latch member from said second retracted position into said first securing position, with said latch member projecting on both sides of said other member.

3,874,803

SWINGING AND LOCKING DEVICE, PARTICULARLY FOR VAPOUR ESCAPE HOODS AT KITCHEN RANGES

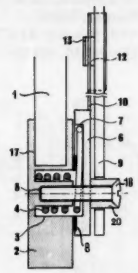
Stig Svensson, Jonkoping, Sweden, assignor to Aktiebolaget Svenska Flaktfabriken, Nacka, Sweden

Filed Apr. 9, 1973, Ser. No. 349,250
Claims priority, application Germany, Apr. 12, 1974, 7213614
Int. Cl. B08b *15/02*
U.S. Cl. 403—92 **11 Claims**

1. Pivoting apparatus for pivotably mounting a first member with respect to a second member, comprising:

housing means securable to said second member and supporting said first member for pivoting about an axis;
locking means detachably securable to said first member at a position spaced from said axis;
follower means supporting said locking means on said housing means for pivoting about said axis;
spring means acting between said housing means and said locking means, and about said axis, for urging a portion said locking means against said first member, when said

first member is pivoted, in a manner tending to rotate said first member relative to said second member; and



means for holding said first member in either of at least two different angular positions about said axis, despite the urging of said spring means.

3,874,804

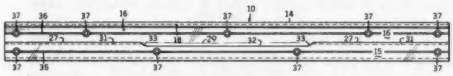
JOINT STRUCTURE

Burton L. Siegal, Chicago, Ill., assignor to Tiffany Industries, Inc., St. Louis, Mo.

Filed May 10, 1974, Ser. No. 468,733

Int. Cl. F16b *12/00*

U.S. Cl. 403—353 **5 Claims**



5. A joint structure for joining furniture parts comprising:

a. a pair of lengthwise interengageable extruded elongate plates each adapted to be attached to one of the parts to be joined and each including:

1. a first tongue having lengthwise extending inner and outer sidewalls,
2. a second tongue having lengthwise extending inner and outer sidewalls,
3. a groove disposed between said first and second tongue said groove having lengthwise extending sidewalls provided by said first and second tongue inner sidewalls said groove of one plate receiving one of the tongues of the other plate, said inner sidewalls including transverse bevel portions overlapping and retaining said received tongue when the elongate plates are in a widthwise reversed, lengthwise coextensive installed condition, and
4. one of said inner sidewalls in each plate including aligned end portions of substantially equal length and a transversely offset intermediate portion having a length greater than said end portions, the offset portion relatively narrowing the received tongue and relatively widening the receiving groove adjacent thereto so that a relatively wide portion of the receiving groove receives a relatively wide portion of said received tongue, and a relatively narrow portion of the receiving groove receives a relatively narrow portion of said received tongue when the plates are disposed in widthwise reversed relation and said elements are lengthwise offset in an incipient installed condition so that the fully installed condition can be achieved from an initially longitudinally overlapped disposition of parts by relative sliding of the plates over a length substantially equal to the length of one of the end portions of said inner sidewall.

3,874,805

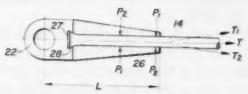
ANCHOR TERMINALS FOR HEADED TIE RODS

Kenneth L. King, County of Suffolk, Weston, Mass.

Continuation of Ser. No. 208,863, Dec. 16, 1971, abandoned, which is a continuation of Ser. Nos. 4,970, Jan. 22, 1970, abandoned, and Ser. No. 4,971, Jan. 22, 1970, abandoned, and Ser. No. 5,059, Jan. 22, 1970, abandoned. This application May 29, 1973, Ser. No. 364,832

Int. Cl. F16g *11/00*

U.S. Cl. 403—360 **3 Claims**



1. A terminal assembly for a rod or the like functioning as a tension member and subject to vibration-inducing air flow, comprising:

a. a rod of cold drawn metal of over 200,000 psi tensile strength,

b. a fitting formed in one piece of solid metal having an eye with a transverse bore adapted to receive a fastening pin, the fitting also having an elongated shank extending away from the eye and having a bore extending longitudinally of the shank from its free end to adjacent bore in the eye, the bore having a diameter substantially the same as the rod to fit snugly around the rod and having a length several times greater than its diameter, the rod extending entirely through the bore and being formed with a head, the head having an annular concave surface which engages a corresponding annular convex surface formed on the fitting around the exit of the bore adjacent said eye, and the lateral extent of the concave surface of said head beyond the periphery of the rod is approximately the radius of the rod.

3,874,806

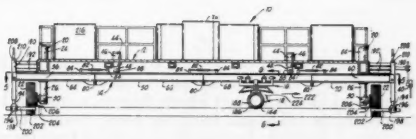
APPARATUS FOR GROOVING PAVEMENT

Warren W. Grist, Yukon, and Adolph R. Petersik, Oklahoma City, both of Okla., assignors to CMI Corporation, Oklahoma City, Okla.

Filed July 27, 1972, Ser. No. 275,460

Int. Cl. E01c *23/16*

U.S. Cl. 404—93 **5 Claims**



1. An apparatus for forming a series of spaced parallel grooves in the surface of a newly laid pavement slab having substantially parallel opposite edge portions comprising:

a maching having opposite side portions, a front end portion and a rear end portion, and movable longitudinally over said pavement slab;

a molding cylinder having opposite end portions and disposed intermediate said machine and said pavement slab, said molding cylinder having a longitudinal rotational axis and having a plurality of spaced circumferential ribs formed on the cylindrical surface thereof;

means for journally securing said molding cylinder to said machine with the longitudinal rotational axis thereof in substantial alignment with the direction of movement of said machine over said pavement slab;

means for raising said molding cylinder above said pavement slab;

means carried by said machine for pressing said molding cylinder into the surface of said pavement slab;

means carried by said maching for moving said molding cylinder over the surface of said pavement slab;

means carried by said machine for rotating said molding cylinder about the rotational axis thereof in the direction of movement over the surface of said pavement slab at a rotational rate greater than the rotational rate of said molding cylinder if rolled freely over the surface of said pavement slab; and,

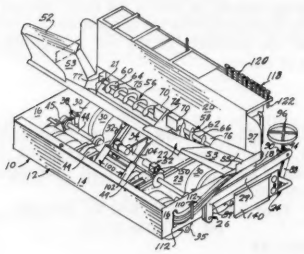
means carried on each side portion of said machine for preventing the circumferential ribs of said molding cylinder from intersecting the respective edge portions of said pavement slab, said means comprising a flat plate secured to each side portion of said machine, each plate having an inwardly extending edge portion positioned above and slightly inwardly of the respective adjacent edge portion of said pavement slab, and each plate lying in a plane substantially parallel to the surface of said pavement slab.

3,874,807

SELF-PROPELLED ASPHALT SPREADER

R. Otis Puckett, and J. Richard Puckett, both of Rt. No. 1, Lithonia, Ga. 30058

Filed Apr. 16, 1973, Ser. No. 351,320
Int. Cl. E01c *19/18*
U.S. Cl. 404—110 **7 Claims**



1. In a machine for distributing hot asphalt and the like wherein there is a machine structure comprising a machine frame having ground support wheels thereon, a movable bed mounted on the top of said frame and being movable to elevate same to distribute hot asphalt on said bed from the machine, said machine structure having a conveyor space defined by the machine structure on the frame through which the hot asphalt and the like is distributed, the improvement comprising:

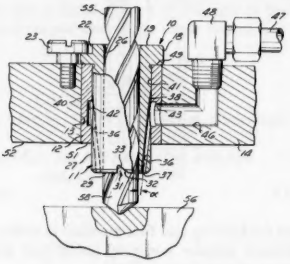
a conveyor means operatively related to said machine frame and mounted for operation in said space, said conveyor directing the hot asphalt to respective sides of said frame, and out of said space, a pivoted gate on said machine operatively mounted on said machine frame to adjust the space from which said asphalt is distributed, said conveyor and said gate being operatively mounted on said machine frame for simultaneous movement on said machine frame whereby said conveyor is moved either toward or away from said movable bed when said gate is opened or closed to increase or reduce the space from which the asphalt is conveyed and to adjust said conveyor in said space.

3,874,808

DRILL BUSHING

Richard A. Zaccardelli, Ames; Robert L. McClendon, Pontiac, and Donald R. Opatrny, Waterford, all of Mich., assignors to Briney Bushing, Inc., Pontiac, Mich.

Filed Nov. 1, 1973, Ser. No. 411,779
Int. Cl. B23b *35/00, 49/02*
U.S. Cl. 408—1 **11 Claims**



9. A method of improving machining efficiency comprising the steps of providing a cylindrical drill bushing, having a longitudinal axis, with circumferentially spaced chip breaking notches across an end face thereof and with flow passages intermediate the notches and convergently directed at a zone forward of said end face, said notches each being provided by forming first and second surfaces extending from inside to outside cylindrical sleeve surfaces, the first surface of each notch being formed in a plane parallel to said axis, the second surface of each notch being formed in a plane obliquely transverse to said axis such that said first and second surfaces intersect at a line spaced from said end face, securing the bushing in a jig plate with the end face a normal distance from the plate and ½ to 1 ½ tool diameters from the workpiece, feeding a tool axially through the drill bushing and simultaneously forcing a liquid coolant through the passages with sufficient velocity to impinge on the tool forward of the bushing to flush chips from the tool laterally into said chip breaking surfaces.

3,874,809

APPARATUS FOR MACHINING SURFACE OF REVOLUTION HAVING DISCONTINUITIES

Robert S. Hahn, Northboro; Arthur F. St. Andre, Marlboro, and Edward G. Robillard, Worcester, all of Mass., assignors to Cincinnati Milacron-Heald Corp., Worcester, Mass.

Continuation of Ser. No. 321,219, Jan. 5, 1973, abandoned, which is a continuation-in-part of Ser. No. 194,581, Nov. 1, 1971, abandoned, which is a continuation of Ser. No. 877,093, Nov. 17, 1969, abandoned. This application Dec. 13, 1973, Ser. No. 424,444
Int. Cl. B23b *47/18, 25/00*
U.S. Cl. 408—3 **3 Claims**

1. Apparatus for generating a surface of revolution having discontinuities on a workpiece by means of a ceramic tool, comprising:

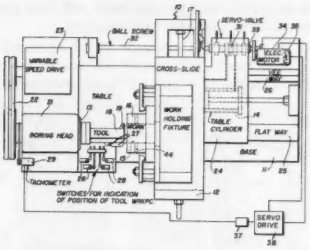
a. a base,

b. a tool support mounted on the base and rotating the tool about the axis of the surface of revolution,

c. a workpiece support slidably mounted on the base for feeding movement in the direction of the surface of revolution, and

d. first control means regulating the rate of rotation of the tool and the speed of the feeding movement of the workpiece support so that the resultant speed of the tool through the workpiece is slow at a position adjacent a discontinuity and relatively rapid at a position remote from a discontinuity, the first control means being comprised of a variable speed motor driving a rotatable spin-

dle on which the tool is mounted, of a hydraulic cylinder connected between the base and the tool support for moving the workpiece support, of a servo valve connected by hydraulic lines to the cylinder for regulating the cylinder, of a screw for adjusting the valve, of a motor connected to the screw for rotating the screw, and a second control means between the tool and the motor to



maintain the lead of the helical path followed by the tool on the workpiece to remain constant irrespective of changes in rate of rotation of the spindle, the second control means comprising means provided on the workpiece support and the base corresponding to the location of disconuities in the workpiece surface relative to the tool and means to signal the first control means that the tool is arriving at the discontinuity.

3,874,810

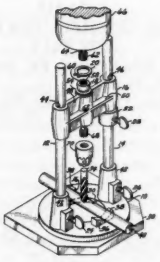
DRILL GUIDE

William D. Russell, Chula Vista, Calif., assignor to Portalign Tool Company, San Diego, Calif.

Filed June 21, 1973, Ser. No. 372,328

Int. Cl. B23b *49/00*

U.S. Cl. 408—14 **7 Claims**



1. A drill guide comprising:

a base plate having a central aperture,

parallel diametrically opposed support rods adjustably positioned and attached to said plate,

a drill motor support between and slidably mounted on said support rods,

said support including a centrally disposed upright housing, a rotatable spindle in said housing,

said spindle having means at its upper end for engagement with a drill motor rotatable shaft and means at its lower end for engagement with a drill chuck, and

a limit stop collar slidably positionable on one of said rods to limit downward movement of said support on said rods, said plate having apertures therein to permit insertion of the lower ends of said rods below said plate and adjustment means on said plate for adjustably positioning said lower ends in the plane of said plate and below said plate.

3,874,811

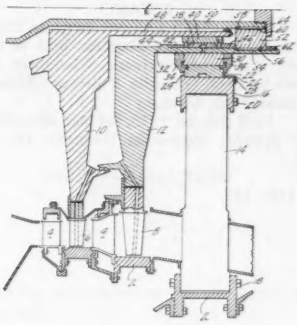
HI AND LOW TURBINE BEARING SUPPORT SYSTEM

William T. Dennison, West Hartford, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Apr. 19, 1974, Ser. No. 462,556

Int. Cl. F01d *1/24*

U.S. Cl. 415—60 **7 Claims**



1. In a turbine construction for a gas turbine, a low pressure turbine rotor having a first projecting stub shaft, a high pressure turbine rotor having a second projecting stub shaft within said first shaft, a casing surrounding said turbine rotors and having a bearing support structure therein, a bearing for and surrounding said first shaft, a bearing between said shafts for and supporting said second shaft, a drive shaft positioned within and in spaced relation to said second shaft and connecting means downstream of the bearings providing a connection from said drive shaft to said first shaft.

3,874,812

AXIAL PRESSURE BALANCING ARRANGEMENT FOR A MULTISTAGE CENTRIFUGAL PUMP

Wolfgang Hanagarth, Frankenthal, Pfalz, Germany, assignor to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal, Pfalz, Germany

Filed Aug. 17, 1972, Ser. No. 281,546

Claims priority, application Germany, Aug. 21, 1971, 2141966

Int. Cl. F04d *5/00;* **F01d** *3/00*

U.S. Cl. 415—106 **3 Claims**

1. In a multi-stage centrifugal pump, a combination comprising a hollow stator; a shaft rotatably mounted in said stator; a pair of axially movable coaxial rotors mounted in said stator adjacent to each other and being driven by said shaft, each of said rotors having a fluid-admitting inlet nearer to and a fluid-discharging outlet more distant from said shaft and the inlet of one of said rotors being in communication with the outlet of the other of said rotors, each of said rotors defining with said stator a gap extending radially inwardly from and communicating with the respective outlet; and channel means

extending from the gap between said stator and said one rotor to the inlet of said other rotor to convey fluid from said last-mentioned gap into said last-mentioned inlet, each of said rotors defining with said stator discrete throttling means for restricting the flow of fluid in the respective gap to an extent which varies in response to changes in the axial position of the respective rotor.

3,874,813
FLUID CIRCULATING APPARATUS

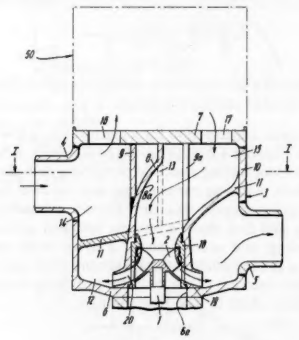
Ernst Honold; Heinz-Bernd Matthias, both of Frankenthal, Germany, and Dusan Florjancic, Winterthur, Switzerland, assignors to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal/Pfalz, Germany

Filed Oct. 24, 1973, Ser. No. 409,335

Claims priority, application Germany, Oct. 25, 1972, 2252299

Int. Cl. F04d *29/44, 29/40*

U.S. Cl. 415—182 **17 Claims**



1. In a fluid flow circulating apparatus, a combination comprising a hollow housing having inlet and outlet ports and including internal partitions subdividing the interior of said housing into a first chamber communicating with said outlet port and a second chamber including a first compartment communicating with said inlet port and a second compartment, said partitions including a dished fluid flow directing member disposed between said compartments and an inclined wall disposed between said first and second chambers, said housing further having at least one first aperture through which a fluid which enters said first compartment via said inlet port can leave said first compartment and at least one second aperture through which fluid leaving said first compartment via said first aperture can enter said second compartment; and a pump installed in said housing and arranged to draw fluid from said second compartment and to introduce pressurized fluid into said first chamber.

3,874,814
CLOSURE KEY APPARATUS

Alexander A. Carroll, Greensburg, and Donald P. Ravicchio, Appolo, both of Pa., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Apr. 5, 1974, Ser. No. 458,148

Int. Cl. F04d *29/40*

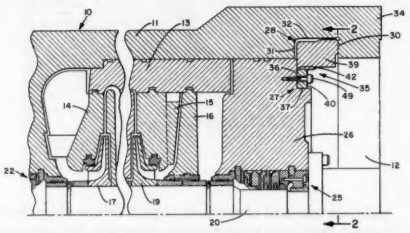
U.S. Cl. 415—219 C **5 Claims**

1. A shear ring closure for supporting an end wall structure carried internally within an opening provided in the casing of a pressure vessel including

a circumferential groove formed about the interior surface of the opening in the casing having a radially extending outer wall in close proximity to the outer end of the casing, a radially extended inner wall and an axially extended bottom surface therebetween,

a shear key seated within the groove and extending inwardly in a radial direction whereby a portion of the key extends into the opening within the casing,

a recessed shoulder formed in the outer periphery of the end wall having a radially extending back wall positioned between the inner and outer end walls of said groove in the casing with the back wall of the shoulder being in contact with the inner face portion of the shear key extending into the casing opening, and an axially extending wall perpendicular to said back wall that penetrates the outer face of said end closure,



a support key seated against the radially and axially extending walls of the recessed shoulder formed in the end wall with the outer surface of the support key being in contact with the bottom surface of the shear key to support the shear key within said groove, and

a pair of raised moment control pads mounted upon the shear key, one of said pads being in contact with the bottom surface of said groove in the casing and the other of said pads being in contact with the outer radially extending end wall of the casing, said pads being strategically located in regard to the center of gravity of the shear key to substantially offset the bending moments exerted thereon by the support key and the back wall of the recessed shoulder formed in the end closure.

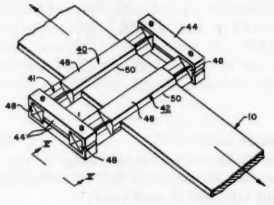
3,874,815
ROTARY HEAD ASSEMBLY FOR ROTARY WING AIRCRAFT

Joseph M. Baskin, Bala Cynwyd, Pa., assignor to The Boeing Company, Seattle, Wash.

Filed Nov. 15, 1973, Ser. No. 416,153

Int. Cl. B64c *27/38*

U.S. Cl. 416—134 **7 Claims**



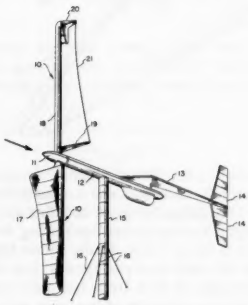
7. A rotor head assembly for rotary wing aircraft comprising a rotor hub, at least one pair of blades disposed on opposite sides of said hub, integral flexible strap means interconnecting said blades, and strap mounting means connecting said strap means to said hub intermediate said blades, said mounting means comprising a pair of elongated devices formed from strip members forming an X-shaped cross-sectional configuration, and an epoxy material filling the cavities formed by the X-shaped configuration at their ends and in the area of their connection to said flexible strap means, wherein said elongated devices extend transverse to the longitudinal axis of said blades at spaced points along said strap means for securing

said strap means to one hub while permitting flexing of the strap means intermediate to the elongated devices, and wherein each of said elongated devices has a degree of torsional flexibility about an axis transverse to said longitudinal axis of said blade which permits each device and the strap mounted thereon to twist about said transverse axis.

3,874,816
WINDMILL BLADE

Thomas E. Sweeney, 95 Hartley Ave., Princeton, N.J. 08540, and Walter B. Nixon, 30 Merritt Dr., Trenton, N.J. 08638

Filed Oct. 23, 1973, Ser. No. 408,837
Int. Cl. F03d *7/00*
U.S. Cl. 416—139 **10 Claims**



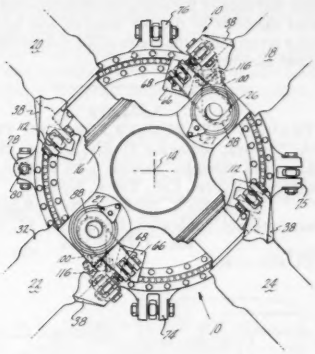
1. A windmill blade comprising a rigid leading edge portion, a rigid root portion connected to said rigid leading edge portion, a rotatable tip member rotatably connected to the outer end portion of said rigid leading edge portion, said rotatable tip member being rotatable about an axis of rotation so positioned that a straight line extension thereof in a direction toward said rigid root portion intercepts said rigid root portion at a point located forward of the aft end thereof, an elongated flexible member having one end thereof connected to said rotatable tip member and the other end thereof connected to the aft end of said rigid root portion and weight means operatively connected to said rotatable tip member for controlling the position of said tip member and the consequent twist of said blade.

3,874,817
APPARATUS FOR FOLDING BLADES WITHOUT CHANGING PITCH DUE TO FOLDING

Donald L. Ferris, Newton, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Nov. 1, 1973, Ser. No. 411,863
Int. Cl. B64c *11/06, 11/28, 27/50*
U.S. Cl. 416—143 **8 Claims**

1. In a helicopter rotor, a drive shaft, a hub on said shaft including a fold pin fixed in said hub having a depending axial extension, a blade mounted on said pin for folding movement, said blade having a horn, a swashplate on said shaft having a portion rotatable with said shaft, a first pivot arm pivotally mounted on the extension of said pin for pivotal movement about a horizontal axis, a first link pivotally connecting said first pivot arm to the rotatable portion of said swashplate, a second pivot arm journalled on said first pivot arm for pivotal movement about an axis coincident with the axis of said pin,

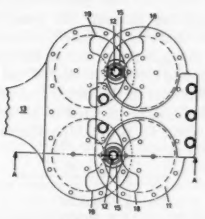


and a second link pivotally connecting said second pivot arm to said blade horn.

3,874,818
BIFILAR VIBRATION DAMPERS

James Edwin Saunders, Bradford Abbas near Sherborne, and Alan Henry Vincent, East Coker near Yeovil, both of England, assignors to Westland Aircraft Limited, Yeovil, Somerset, England

Filed Oct. 1, 1973, Ser. No. 402,140
Claims priority, application United Kingdom, Oct. 19, 1972, 48178/72
Int. Cl. B64c *27/32*
U.S. Cl. 416—144 **9 Claims**



1. A bifilar vibration damper indlucing in combination: a support arm adapted to extend radially from and to be rotated in a plane about an axis of rotation and having two arcuate slots extending therethrough, the slots being concentric about parallel axes which are parellel to and equidistant from the axis of rotation and located with their concave surfaces closest the axis of rotation, a pendulous member of U-shaped cross section having substantially parallel side plate members positioned on opposite sides of said support member and spaced therefrom so as to define a spacing distance from said support member when said pendulous member is centered laterally with respect to the support member, each side plate member having two arcuate slots extending therethrough, the slots being concentric about parallel axes which are substantially parallel to the axis of rotation and being of substantially the same dimensions as the support member slots, the slots in each side plate member being sligned respectively with the slots of the other side plate member and located with their convex surfaces closest the axis of rotation, a pin member extending through each of the slots of the support member and the aligned slots of the side plate members to connect the pendulous member to the support member, the pin member being of

substantially circular cross section and concentric about a straight line axis and having a diameter less than the width of the slots, an annular washer positioned between the support member and each of the side plate members and connected at its inner diameter to the pin member and having an outer diameter greater than the width of the slots in the support and side plate members.

3,874,819

FRANCIS TYPE RUNNER FOR PUMP TURBINE

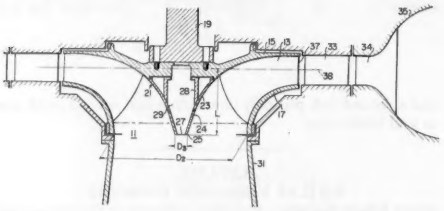
Rycichi Tamura; Masayasu Okada, both of Hitachi; Mituo Takase, and Masahiro Yamabe, both of Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 9, 1973, Ser. No. 358,548

Claims priority, application Japan, May 12, 1972, 47-356

Int. Cl. F01d *5/04*

U.S. Cl. 416—186 **8 Claims**



1. A Francis type runner unit for a pump-turbine comprising a runner secured to a main shaft of the turbine and including a plurality of blades, a crown ring disposed above said blades and a shroud ring disposed beneath said blades, a draft tube disposed at an outlet of the runner, and a runner cone secured to said runner, said runner cone having a substantially planar remote end and being shaped so that L lies within the range of from $0.35D_2$ to $2.5D_2$, said planar remote end protruding beyond a line passing through the lowermost ends of the blades toward the draft tube, where L is the distance between the line passing through the center of the height of the outer end of said blades and the remote end of said runner cone, and D_2 is the inner diameter of the outlet end of said shroud ring, wherein the ratio D_3/d_2 is selected to lie within the range of $0<D_3/D_2<0.12$ where D_3 is the outer diameter of the remote end of said runner cone.

3,874,820

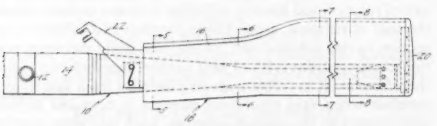
HINGELESS IN-PLANE ROTOR BLADE DESIGN

Ronald Raymond Fenaughty, Trumbull, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Apr. 8, 1974, Ser. No. 458,926

Int. Cl. B64c *27/46*

U.S. Cl. 416—226 **7 Claims**



1. A hingeless rotor wing system including at least one rotor blade having an operating angle range extending from a minimum angle to a maximum angle, said blade having a spar extending over a majority of the blade span, controlling the primary blade vibration frequencies, said spar having a major axis, structural means surrounding said spar and defining an airfoil shape for said rotor blade, said structural means also having a major axis, the angular relationship of said spar major axis and said structural means major axis being substantially equivalent to the mean blade angle of said blade operating angle range.

3,874,821

HYDRAULIC PUMP

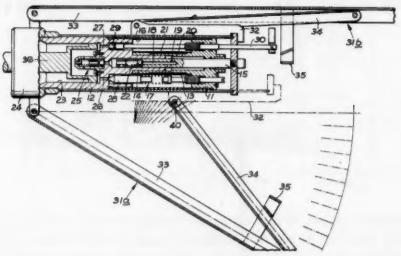
Witold Nagorski, 13, Creighton Ave., London, and Zdzislaw Bieganski, Brushwood, Kingsbourne Green, Harpenden, both of England

Filed Apr. 17, 1974, Ser. No. 461,517

Claims priority, application United Kingdom, Apr. 27, 1973, 20028/73

Int. Cl. F04b *21/00*

U.S. Cl. 417—235 **11 Claims**



1. A hydraulic pump comprising: an elongate body defining first and second axially successive chambers; an axial fluid-passageway extending between said first and second chambers; a plunger, having one end projecting from the elongate body, which is reciprocable axially within said first chamber and extends into said fluid-passageway; and valve means controlling admission of fluid from said first chamber into said fluid-passageway, operation of the valve means being coordinated with movement of the plunger in such a way that admission of fluid into said passageway from said first chamber occurs in response to axial movement of the plunger away from the second chamber and is prevented in response to axial movement of the plunger towards said second chamber, whereby in the latter movement the plunger forces fluid from said passageway into the second chamber; wherein the improvement comprises

a coupling member mounted on the elongate body of the pump and guided thereby for reciprocation axially of the pump body and parallel to the plunger;

said member being drivingly coupled to the end of the plunger which projects from the elongate body; and

lever means which acts between the pump body and said coupling member and is operable to reciprocate said coupling member and hence the plunger.

3,874,822

ELECTROMAGNETIC PLUNGER PUMP

Tadashi Nakamura, 3-7, Minanizawa 3-chome, Higashikurume-shi, Tokyo, Japan

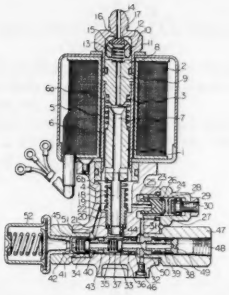
Filed Oct. 31, 1973, Ser. No. 411,271

Int. Cl. F04b *49/00*

U.S. Cl. 417—311 **5 Claims**

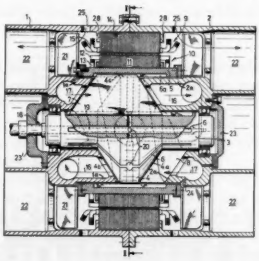
1. In a reciprocating electromagnetic pump including a cylinder, a magnetic piston having a flow-passage therethrough and having inlet and outlet ends and slidably mounted in the cylinder, said cylinder defining a pumping chamber surrounding the inlet end of said piston and receiving fluid therein, means for reciprocating the piston including an electromagnetic coil coaxial to said magnetic piston, a power source coupled to said electromagnetic piston for selective activation thereof, and a check valve mounted on the piston in the fluid flow-passage and including a fixed valve seat and a movable valve member of magnetic material cooperating with the seat to close said passage, said movable member

being so positioned as to be drawn away from its seat by the attraction of the electromagnetic coil during operation of the pump to allow fluid flow, the improvements which comprise said check valve being mounted adjacent the outlet end of said



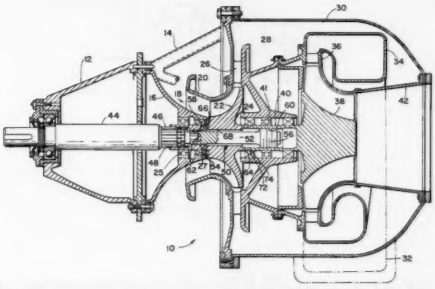
piston flow-passage and said power source being half-wave rectified current, whereby the flow of fluid discharged from the pump is completely halted upon interruption of the power supply.

3,874,823
COMPRESSOR
Auvo A. Savikurki, Nekala, Tampere, Finland
Filed July 23, 1973, Ser. No. 381,579
Int. Cl. F04b *17/00*
U.S. Cl. 417—356 **11 Claims**



1. A compressor, comprising, in combination,
a compressor housing;
said compressor housing comprising a pair of opposed housing end portions;
a rotor shaft journalled in said housing end portions;
a compressor rotor projecting radially from said rotor shaft; a cylindrical mantle extending around said compressor rotor and secured to said compressor rotor for rotation therewith;
means defining a plurality of slots in said compressor rotor; a plurality of vanes extending through the rotor slots and slidable longitudinally of said rotor shaft in a compressor chamber between said rotor shaft and said cylindrical mantle;
means defining a fluid inlet and a fluid outlet communicating with the compressor chamber;
stationary vane guide surfaces extending around said shaft for effecting reciprocation of said vanes longitudinally of said rotor shaft on rotation of said rotor shaft;
whereby fluid is drawn in through the fluid inlet and discharged through the fluid outlet on rotataion of said rotor shafts; and
an electric motor for rotating said rotor shaft;
said electric motor comprising a motor rotor extending around the exterior of and secured to said cylindrical mantle, said housing end portions comprising opposed stationary cylindrical portions at opposite sides of said compressor rotor; and
said cylindrical mantle having opposite ends which tightly encircle said cylindrical portions, whereby said compressor chamber is separated from said electric motor.

3,874,824
TURBOMACHINE ROTOR ASSEMBLY
Val Cronstedt, Williamsport, Pa., and Wayne C. Shank, Tucson, Ariz., assignors to Avco Corporation, Williamsport, Pa.
Filed Oct. 1, 1973, Ser. No. 401,969
Int. Cl. F04b *17/00*
U.S. Cl. 417—406 **9 Claims**

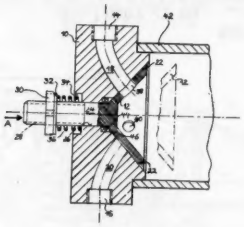


1. A turbomachine rotor assembly comprising:
a first bladed turbomachine component and a first central tubular shaft having an end face;
a second bladed turbomachine component having a second central tubular shaft coaxial with said first shaft and having an end face, said end faces having complementary splines for circumferentially locking said shafts when said faces are abutting;
a bolt received in the interior of said first and second shafts, said bolt having first and second threaded portions respectively engaging the first and second threaded portions on said first and second shafts, the number of threads per unit length on said first portion being different from that for the second threaded portion; and
wrench receiving means on the axis of said bolt for receiving a rotatable wrench for turning said bolt, whereby when said bolt is turned in a given direction relative to said turbomachine components the end faces of said shafts are drawn into tight axial abutment and said components are circumferentially locked by said complementary splines.

3,874,825
MULTI-WAY TAP FOR A FILLING MACHINE
Hans G. Jentsch, Daimler Strasse 4, 43 Essen, Germany
Filed July 20, 1973, Ser. No. 381,182
Int. Cl. F04b *7/00*
U.S. Cl. 417—519 **6 Claims**

1. A multi-way tap for a fluid filling machine, comprising in combination: an enclosed hollow casing including external inlet port connections and having an internal seat surface; a control member disposed in said casing and having a mating surface complementary to said seat surface; a stub shaft extending into said casing and being connected to said control member to mount the same for rotation about an axis common with that of said seat surface; said control member being formed with a plurality of inlet ports; respective passages being disposed in said casing which lead from said external port connections toward said seat surface and the location of at least one of said inlet ports; the angular position and spacing

of said inlet ports defining a sole flow path at any given time for a fluid through only one of said external port connections via one of said passages and one of said inlet ports; and clamping means operatively coupled to said control member for resiliently urging said mating surface into engagement with said seat surface; said casing having a free space formed adjacent said seat surface, and said clamping means being releasable to enable movement of said control member into said free space during a cleansing operation of the tap by displacement of said stub shaft between a normal and an inwardly displaced position; said stub shaft being connected to said control member on the side of the latter which defines said mating surface,



and said casing being formed with said free space on the side of said control member opposite to said mating surface; said casing having a bore that receives said stub shaft, said bore including an annular groove adjacent the inner end thereof, and a sealing ring disposed in said groove to seal said stub shaft against said bore so that a fluid-tight seal is provided between said stub shaft and said sealing ring, both in a normal operating position of said control member and in the displaced position of said stub shaft, in order to enable the cleansing operation of the tap internally, in closed circulation with liquid treating media, whereby inadvertent leaking out of the media is prevented during the cleansing operation.

3,874,826

INTRAVENOUS DELIVERY PUMP

Ingemar H. Lundquist, 113 Sunvalley Rd., Oakland, Calif. 94605, and 104, 72, 329,425, 03

Continuation-in-part of Ser. No. 329,425, Feb. 5, 1973, abandoned. This application Jan. 8, 1974, Ser. No. 431,753

Int. Cl. F04b *39/10*

U.S. Cl. 417—565 **9 Claims**

1. A small, precise measuring pump having a germ barrier comprising:

a. a non-deformable inlet chamber and an outlet chamber attached thereto;

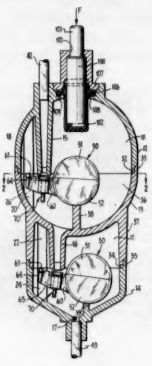
b. an inlet into said inlet chamber and a communication duct from said inlet chamber into said outlet chamber;

c. a valve in said inlet chamber cooperating with said inlet and a valve in said outlet chamber cooperating with said communication duct;

d. an outlet from said outlet chamber;

e. a piston having an inner end section projecting through the wall of said inlet chamber and adapted to be moved inwardly and outwardly therein, said piston having an exposed outer end portion which remains outside said chamber and is adapted for engagement by a piston actuating means;

f. a resilient sheath entirely enclosing the portion of said piston which is inside said inlet chamber and having means external to the inlet chamber for sealing engagement with the outer wall of the inlet chamber and further



means external of the inlet chamber for sealing engagement with the outer surface of said piston.

3,874,827

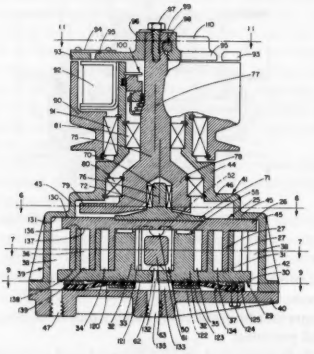
POSITIVE DISPLACEMENT SCROLL APPARATUS WITH AXIALLY RADIALLY COMPLIANT SCROLL MEMBER

Niels O. Young, Hurricane Hill Rd., Mason, N.H. 03048

Filed Oct. 23, 1973, Ser. No. 408,287

Int. Cl. F01c *1/02, 21/00;* **F04c** *17/02*

U.S. Cl. 418—55 **15 Claims**



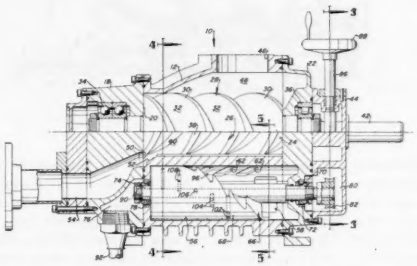
1. In a positive fluid displacement apparatus into which a fluid is introduced through an inlet port for circulation therethrough and subsequently withdrawn through a discharge port, and in which first and second scroll members having wraps which make moving line contacts to seal off and define at least one moving pocket of variable volume and zones of different fluid pressure when said first scroll member is driven to perform an orbit with respect to said second scroll member and to a stationary frame to which said apparatus is mounted while maintaining a fixed angular relationship between said scroll members and said stationary frame, the improvement which comprises compliant attachment means joining said scroll member to said stationary frame in a manner to permit said second scroll member to undergo excursions in the axial direction in response to externally applied axial forces and to undergo excursions in the radial direction solely in response

to internally applied radial forces; and means to counterbalance all of that part of the centrifugal force component produced by the orbiting of said scroll members which would otherwise increase the radial sealing force.

3,874,828
ROTARY CONTROL VALVE FOR SCREW COMPRESSORS

Michael G. Herschler; Robert R. Anderson, and John C. Shoop, all of Quincy, Ill., assignors to Gardner-Denver Company, Quincy, Ill.

Filed Nov. 12, 1973, Ser. No. 415,279
Int. Cl. F01c *21/04*; F04c *29/02*; F01c *1/16*
U.S. Cl. 418—87 **11 Claims**



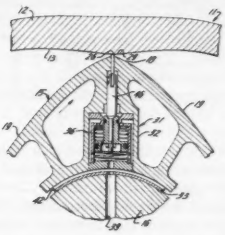
1. In a helical screw gas compressor:
a casing having two parallel intersecting bores;
an inlet port and a discharge port opening into said bores; interengaged helical screw rotors disposed in said bores and characterized by cooperating helical grooves and lobes forming working chambers operable to entrap and compress gas admitted to said bores through said inlet port;
a cylindrical chamber formed in said casing and having an opening in communication with said inlet port;
a plurality of auxiliary ports formed in said casing and opening to at least one of said bores and to said chamber, said auxiliary ports being spaced apart axially with respect to the longitudinal axis of said one bore;
a rotatably turnable control valve member disposed in said chamber characterized by a portion forming a closure for said auxiliary ports delimited by a control edge coactable with said auxiliary ports for opening and closing said auxiliary ports in response to turning said valve member whereby the gas throughput of said compressor is controlled in accordance with the opening and closing of said auxiliary ports by said valve member;
means for turning said valve member; and,
passage means for injecting liquid into said bores for mixing with said gas being compressed by said rotors, said passage means being operably associated with said valve member whereby the effective fluid flow area of said passage means is increased in response to the turning of said valve member to close said auxiliary ports.

3,874,829
SEALING DEVICE FOR ROTARY MECHANISMS

Winthrop B. Pratt, North Haledon, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed Nov. 19, 1973, Ser. No. 417,031
Int. Cl. F01e *19/04*
U.S. Cl. 418—115 **6 Claims**

1. In a rotary mechanism having a housing with a peripheral wall and a pair of parallel end walls defining a cavity therein with an axis transverse to the end walls, the peripheral wall having an inner surface of trochoidal profile wherein the curvature is alternately concave and convex with respect to the axis, and a rotor supported for eccentric rotation within the cavity and defining with the housing walls a plurality of working chambers of variable volume, the rotor being of generally polygonal profile and having a plurality of apex portions, each apex portion of the rotor having an axially extending slot with a sealing bar disposed therein for radially reciprocative movement within the slot and sweeping the trochoidal surface in sealing relation thereto, the sealing bar being subject to radially outward centrifugal force while traversing the concave portion of the peripheral surface and radially inward centrifugal force while traversing the convex portion of the peripheral surface, and biasing means urging the sealing bar in the outward direction, wherein the improvement comprises:
a. oil cushioning means disposed within the rotor in each apex region thereof, the oil cushioning means comprising at least one barrel member having double-acting piston



means therein slidable within the barrel in the radial direction with respect to the rotor axis and connected to the sealing bar, the barrel containing oil radially inward and radially outward of the piston means;
b. the oil cushioning means having first passage means for relatively free flow of oil from the position radially inward from the piston to the position radially outward from the piston, and having second passage means restricted for retarded flow of oil from the position radially outward from the piston to the position radially inward from the piston;
c. inward centrifugal force on the sealing bar impelling the double-acting piston means inwardly at a relatively rapid rate to permit disengagement of the sealing bar from the peripheral surface, and outward centrifugal force on the sealing bar impelling the double-acting piston means outwardly at a relatively slower rate to retard reengagement of the sealing bar with the peripheral surface.

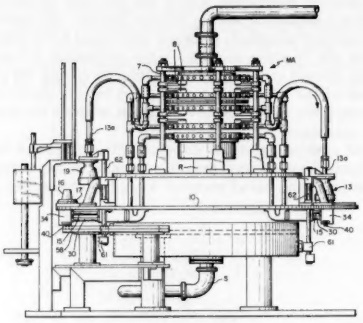
3,874,830
APPARATUS FOR POST TREATING PREFORMED FOAM CONTAINERS

Paul H. Carter, deceased, late of Baltimore, Md. (by Leona Marie Carter, Studio City, Calif., personal representative), and Thomas E. Marion, Owings Mills, Md., assignors to Maryland Cup Corporation, Owings Mills, Md.

Filed May 16, 1973, Ser. No. 361,351
Int. Cl. B29c *1/16*; B29d *27/00*
U.S. Cl. 425—4 R **6 Claims**

1. An apparatus for post treating assembled containers made from foamed plastic sheet material comprising a rotatable table with an upper peripheral surface, mold assemblies mounted in a circular path on said upper peripheral surface, said assemblies having mating male and female parts, said male part being horizontally movable radially inboard and outboard of said table surface, into and out of alignment with said female part, said female part being vertically movable upward above said male part and to permit the latter to move outward of said table to a container loading position, said table starting rotation at the loading position and continuously rotating therefrom, cam means activated by said table as it

rotates for moving said male and female parts to said container loading positions and thence to closed mating positions to confine the container between the said parts, each of said parts having holder means with inlet ports in said holder



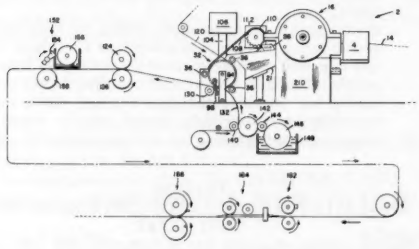
means for introducing first steam and then air into said ports in said holder means and said mold parts to treat said container confirmed between them, as the table revolves; said steam acting to expand said container within said mold parts to impart uniform finish and dimension to said containers.

3,874,831

MACHINE FOR PRODUCING PULP BATS

Fred G. Schroeder, Media, Pa., assignor to Fibre Formations, Inc., Philadelphia, Pa.

Filed Aug. 9, 1973, Ser. No. 387,143
Int. Cl. B29c *13/04, 15/00*
U.S. Cl. 425—80 **12 Claims**



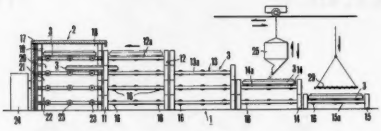
1. A machine for producing uniform pulp bats comprising:
a rotary shredder,
a drum having perforations in its periphery, means to guide a porous sheet to pass over a portion of the drum and then away from the drum at a terminal position,
duct means to convey shredded pulp from the shredder to said porous sheet for a uniform accumulation on said porous sheet,
vacuum means communicating with the inner periphery of the drum opposite the duct means and terminating adjacent the said terminal position, and
means to guide a second sheet adjacent to and then away from said terminal position to retain the accumulated shredded pulp between the porous sheet and said second sheet.

3,874,832

APPARATUS FOR PRODUCING PRECAST CONCRETE MEMBERS

Tohru Ohta, Tokyo, Japan, assignor to The Shimizu Construction Co. Ltd., Tokyo, Japan

Filed Jan. 11, 1973, Ser. No. 322,719
Claims priority, application Japan, Jan. 11, 1972, 47-4971; Jan. 14, 1972, 47-5876; Jan. 21, 1972, 47-7684
Int. Cl. B28b *15/00*
U.S. Cl. 425—88 **4 Claims**



1. Apparatus for producing precast concrete members, comprising:
a curing chamber having a side facing a concrete placing section; means in said curing chamber for curing concrete;
a concrete placing section having a side facing said curing chamber side;
concrete form members for receiving concrete while said form members are in said concrete placing section and for forming and shaping the concrete into a predetermined shape and which carry the concrete they receive into said curing chamber;
means for supporting and moving said form members into and between said curing chamber and said concrete placing section;
said supporting means for said form members comprises a first plurality of vertically spaced layers of supports for concrete form members positioned in said curing chamber;
a second plurality of rack means for carrying said members; said rack means being arranged one after the other in a series leading up to said curing chamber side and the last of said rack means being positioned at said curing chamber side; each said rack means being at least the length of a said form member in the dimension along the series thereof;
each said rack means including a respective plurality of vertically spaced layers of supports for concrete form members; said rack means nearest said curing chamber side having said first plurality of layers of supports, and each said rack means next in series further away from said curing chamber side having one fewer of said layers of supports, reducing downwardly from the uppermost said layers of supports; each said rack means layer of supports being aligned with a respective said layer of supports being aligned with a respective said layer of supports of said curing chamber, thereby enabling said form members to be moved along said rack means and into said curing chamber;
means for reciprocally moving said form members between the said rack means at which each said form member is at the top said layer of supports and said curing chamber.

3,874,833

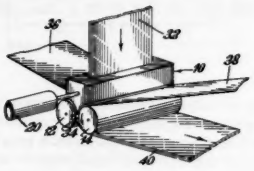
APPARATUS FOR THE CALENDERING OF LAMINATED POLYMERIC MATERIALS

Fred H. Ancker, Warren, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 229,349, Feb. 25, 1972, which is a continuation-in-part of Ser. No. 839,292, July 7, 1969, Pat. No. 3,658,978. This application July 9, 1974, Ser. No. 486,750

Int. Cl. B29f *3/012*

U.S. Cl. 425—115 **4 Claims**



1. Apparatus for the calendering of laminated polymeric materials, comprising a pair of cylindrical counter-rotating calender rolls positioned to define therebetween a nip opening, and volumetric obstruction means positioned across the width and between said pair of calender rolls, said obstruction means projecting into the space between said pair of calender rolls so as to at least penetrate the bank material otherwise formed between the pair of calender rolls upstream of the nip by the selection of calendering conditions, said obstruction means having a central slot across its width for the feeding of a web of laminating material to said pair of calender rolls enclosed between two side slots for the extrusion of two streams of polymeric material to said pair of calender rolls.

3,874,834

CONTINUOUS EXTRUSION MACHINE FOR MANUFACTURING PLASTIC NETS

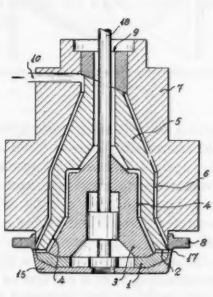
Ignacio Aurrecoechea Arechavaleta, Bilbao, Spain, assignor to Triker S.A., Bilbao, Spain

Filed Mar. 16, 1973, Ser. No. 341,880

Claims priority, application Spain, Mar. 21, 1972, 401037

Int. Cl. B29d *23/04;* **B29f** *3/04*

U.S. Cl. 425—132 **16 Claims**



1. A continuous extrusion machine for manufacturing a continuous net like mesh, which mesh is comprised of a first array of spaced apart filaments generally extending in a first direction, a second array of spaced apart filaments generally extending in said first direction and all of the filaments of the second array being generally offset in said first direction from filaments in the first array and individual filaments of the second array being offset sideways from the adjacent individual ones of the first array of filaments, and a third array of spaced apart filaments, each extending transversely to and intersecting both of a first and a second array of filaments and serving to separate those first and second arrays of filaments along said first direction;

said machine comprising:

a housing defining and surrounding a pressure chamber;

a first plurality of filament sized outlets from said pressure chamber arrayed in a row and spaced apart predetermined distances;

a die element disposed adjacent to said first outlets and having a second plurality of filament sized outlets arrayed in a respective row and spaced apart respective predetermined distances; the spacing apart of at least some of said second outlets differs from the spacing apart of at least some of said first outlets;

individual ones of said first and said second outlets being shaped to be selectively aligned to permit passage of material therethrough and to be selectively misaligned so as to block such passage; said first and said second outlets being positioned to enable selective alignment of individual ones of said first and said second outlets;

means for moving said die element with respect to said first outlets for selectively aligning a first group of said first outlets with a first group of said second outlets while misaligning a second group of said first outlets with a second group of said second outlets, and for thereafter aligning said second group of said first outlets with said second group of said second outlets while misaligning said first group of said first outlets with said first group of said second outlets;

a third outlet from said pressure chamber; said third outlet being shaped so as to cause extrusion of a filament of the third array of filaments each time said third outlet is open; said third outlet being positioned sufficiently close to said first and second outlets as to deposit material extruded from said third outlet on the material extruded from the aligned said groups of said first and said second outlets after the material has been extruded;

blocking means movable between a first position which blocks said third outlet and a second position which unblocks said third outlet.

3,874,835

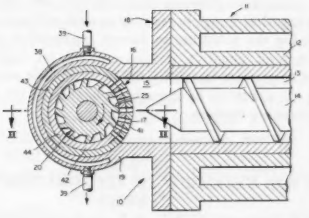
FACE-CUTTING APPARATUS FOR FORMING PELLETS

Paul H. Rossiter, Paoli, and Richmond S. Parsons, Warminster, both of Pa., assignors to Welding Engineers, Inc., King of Prussia, Pa.

Continuation-in-part of Ser. No. 130,586, April 2, 1971, abandoned. This application Feb. 12, 1973, Ser. No. 331,603

Int. Cl. B29c *17/14;* **B29b** *1/02*

U.S. Cl. 425—306 **23 Claims**



1. Face cutting apparatus for making pellets of thermoplastic material comprising:

a. an extrusion device including at least one concavely shaped die plate means having a plurality of spaced-apart extrusion orifices through which heat-plastified material is adapted to be extruded;

b. cutter means having a cylindrical body mounted for rotation about its longitudinal axis which is aligned with the axis of said die plate means, said die plate means cylindrically enclosing the cutter means and having a center concentric with the center of said cutter means;

c. said cutter means also having a plurality of spaced-apart blades projecting radially from and extending longitudinally along said body, said die plate means being closedly spaced from said cutter blades all around the periphery of said cutter to define confined channels between said blades

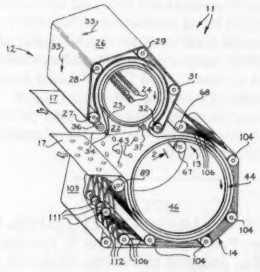
d. each of said blades having on its free end, a cutting edge which is closedly spaced adjacent to the downstream face of said die plate means upon rotation of said cutter means and which is adapted to shear heat-plastified material extruded through said orifices into pellets;

e. adjacent pairs of said blades and the intervening body portion of said cutter means together with said die plate means establishing longitudinally extending substantially enclosed channels between said blades in which said pellets are adapted to flow.

3,874,836
RECORD PRESS FOR DUPLICATING PRE-RECORDED RECORDS

Reynold B. Johnson, Palo Alto, and Ronald D. Irvin, Los Gatos, both of Calif., assignors to Education Engineering Associates, Palo Alto, Calif.

Filed Jan. 10, 1974, Ser. No. 432,316
Int. Cl. B29d *17/00*; B29g *7/02*
U.S. Cl. 425—363 **13 Claims**



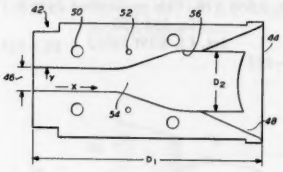
9. In a press for continuously pressing pre-recorded records onto a substrate of thermal plastic material, means forming a cyclically moving embossing surface carrying negative images of pre-recorded records to be applied to said substrate, means for heating and carrying said substrate to said embossing surface, means for pressing said substrate and said embossing surface together to apply records to said substrate, means for maintaining the substrate in secure registration contact with the embossed negative images carried on said embossing surfaces to prevent smearing the record while simultaneously cooling the substrate by transfer of heat from the substrate to said embossing surface.

3,874,837
DIE FOR EXTRUSION OF FINE GRAINED GREEN CARBON

Charles P. Jamieson, Buffalo, N.Y., assignor to Airco Inc., New York, N.Y.

Filed Sept. 18, 1972, Ser. No. 290,200
Int. Cl. B29f *3/04*
U.S. Cl. 425—378 **5 Claims**

1. In a die for the extrusion of a calcine-binder mix to form a green carbon, shaped extrudate, the improvement wherein: said die includes a channel, the profile of which is converged to satisfy the criteria that shear be minimized for a perfectly plastic material passed therethrough; a stress relief die extension being fitted to the output end of the die and comprising the exit section for said shaped extrudate, said die extension including a second channel diverging slightly in cross-section

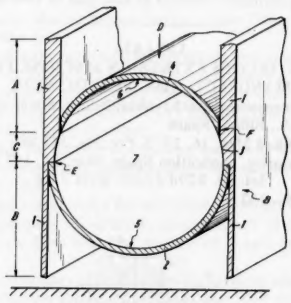


from the input to output ends of said extension for enabling a constrained gradual expansion of the extrudate to its final expanded thickness, so as to avoid defects generated by sudden expansion of said extrudate; and wherein means are provided for cooling said die extension to control the extrudate flow field.

3,874,838
MOLDING APPARATUS

Josef Granderath, and Guenter Helmrich, both of Grevenbroich, Germany, assignors to Vereinigte Aluminum-Werke Aktiengesellschaft, Bonn, Germany

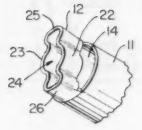
Filed Dec. 21, 1972, Ser. No. 317,357
Claims priority, application Germany, Dec. 24, 1971, 2164487
Int. Cl. B29c *3/00*
U.S. Cl. 425—408 **7 Claims**



1. In an apparatus for vibration compacting of particulate materials, a mold comprising a lower mold section including two substantially upright transversely spaced wall portions each having a concave surface portion, and a transverse wall portion extending between said upright wall portions and being rigidly connected thereto and having a concave surface, said concave surface and said concave surface portions of said upright wall portions together forming a transition-less first forming surface extending over a portion of arc greater than 180°; and an upper mold section mounted between said upright wall portions for displacement with respect thereto between a retracted position in which the material to be compacted may be introduced into a space defined by said upright wall portions and said transverse wall portion, and a molding position, said upper mold section having a concave second forming surface extending over a portion of arc complementary to said portion of arc of said first forming surface and facing and defining with the latter a mold cavity having the shape of a desired article when said upper mold section is in

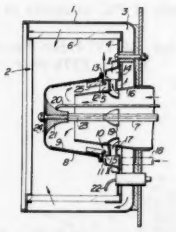
said molding position thereof and bounded by the continuously merging first and second forming surfaces, whereby the article is uniformly compacted during the displacement of said upper mold section into said molding position thereof and a seamless exterior surface of the article is obtained when said upper mold section reaches said molding position thereof.

3,874,839
BURNER CONSTRUCTION AND METHOD AND APPARATUS FOR MAKING SAME
Fred Riehl, Greensburg, Pa., assignor to Robertshaw Controls Company, Richmond, Va.
Filed Nov. 2, 1973, Ser. No. 412,103
Int. Cl. F23d *13/40*
U.S. Cl. 431—354 **15 Claims**



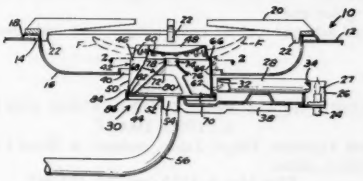
1. A burner construction having a fuel receiving chamber therein and port means interconnected to said chamber for issuing said fuel therefrom, said burner construction having an inlet means for attaching to a fuel supply member in a telescoping manner therewith, said inlet means having gripping means for resiliently gripping said fuel supply member to prevent rattling therebetween, said gripping means comprising two opposed flexible strips forming gripping parts for engaging said fuel supply member and having opposed ends respectively interconnected together by substantially C-shaped resilient parts disposed spaced from said fuel supply member.

3,874,840
LIQUID FUEL BURNER
Kingo Miyahara, Tokyo, Japan, assignor to Kabushiki Kaisha Dowa, Tokyo, Japan
Filed May 13, 1974, Ser. No. 469,543
Claims priority, application Japan, July 23, 1973, 48-82995
Int. Cl. F23d *11/04*
U.S. Cl. 431—168 **4 Claims**



1. A liquid fuel burner for burning liquid fuel by gasifying the same, comprising:
a main body made of sheet iron or the like and having a small thickness;
a gas chamber formed along an inner peripheral surface of said main body and having a central opening;
a fuel gasifying member rotatably disposed in said central opening of said gas chamber and maintained in communication therewith; and
means for preventing overheating of an inner bottom wall of said main body, said overheating preventing means comprising a cold air ejection gap formed between said fuel gasifying member and said central opening of said gas chamber, and an air ejection chamber disposed at a marginal portion of said central opening of said gas chamber and facing said cold air ejection gap so as to be maintained in communication therewith, cold air introduced from outside into said air ejection chamber being ejected through said cold air ejection gap into the interior of said main body whereby an air curtain can be formed above the inner bottom wall of said main body to intercept the flames of combustion and keep the same from reaching the inner bottom wall.

3,874,841
GAS BURNER
William J. Ferlin, Detroit, Mich., assignor to Lincoln Brass Works, Inc., Detroit, Mich.
Filed Apr. 19, 1974, Ser. No. 462,374
Int. Cl. F24c *3/10*
U.S. Cl. 431—193 **11 Claims**

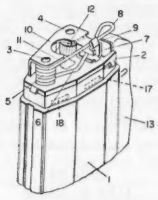


1. In a gas burner having a chamber defined by a bottom having a fuel gas inlet, a top and a side wall apertured to provide burner ports and flash-tube-charge-and ignition porting, improved structure which comprises,
said inlet having a location which is substantially centered with respect to said bottom and top,
means providing a baffle in said chamber between and substantially centered with respect to said bottom and top,
said baffle having generally the shape of an inverted funnel with a lower edge, an upward opening and a wall therebetween,
said lower edge having a diameter greater than that of said inlet and being located above said flash-tube-charge-and ignition porting,
said upward opening having a diameter smaller than that of said inlet and being spaced below said chamber top,
said funnel wall being contoured to effect deflection of fuel gas entering said chamber toward said flash-tube-charge-and ignition porting.

3,874,842
GAS-FUELLED LIGHTER
Alfred Racek, Zwerngasse 59, 1170 Vienna, Austria
Filed Dec. 4, 1973, Ser. No. 421,666
Claims priority, application Austria, Dec. 5, 1972, 10343/72
Int. Cl. F23q *1/02*
U.S. Cl. 431—276 **3 Claims**

1. A gas-fuelled lighter, which comprises
a housing,
a cover, which is detachably connected to said housing,
an opening for the passage therethrough of a gas flame which is arranged in said cover,
a pyrophoric igniting mechanism which is mounted on said cover and includes
a friction wheel axle,

a friction wheel rotatably mounted on said axle,
a flint guide terminating close to said friction wheel,
said flint guide extending transversely to the axis of said opening



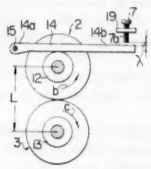
a spring-retaining pin,
a helical torsion spring wound on said pin and having an extended end portion, which extends into said guide and tends to move toward said friction wheel,
said axle and said pin extending transversely to said flint guide and
said axle and said pin being integral with said cover.

3,874,843

METHOD OF AND DEVICE FOR HEATING AND FIXING A TONER IMAGE

Sakae Fujimoto, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed May 4, 1973, Ser. No. 357,097
Claims priority, application Japan, May 11, 1972, 47-46997
Int. Cl. G03g *5/00;* **H05b** *3/10*
U.S. Cl. 432—60 **18 Claims**



1. An apparatus for heating and fixing a toner image comprising

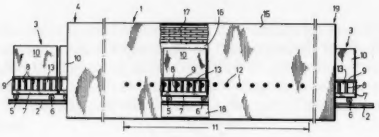
a. a pair of fixing rolls adapted to have a copy sheet with a toner image formed thereon fed therebetween,
b. means for movably supporting one of said fixing rolls relative to the other fixing roll to vary the interaxial distance between said rolls,
c. means for heating at least one of said fixing rolls, said last-mentioned roll undergoing radial thermal expansion when heated by said heating means, and
d. means for limiting an increase in the interaxial distance between said pair of fixing rolls when said one heated fixing roll undergoes radial thermal expansion such that radial thermal expansion of said one roll effects pressure between the rolls,
e. said limiting means comprising means for restraining movement of the axis of said movably supported roll away from the other of said rolls only beyond a point at which the rolls are in contact when said one heated roll has been radially thermally expanded by a predetermined amount owing to heating by said heating means.

3,874,844

TUNNEL KILN

Heinz Behrens, Kiel; Paul Schneider, and Ernst Zapf, both of Rodental, all of Germany, assignors to Heinz Behrens, Kiel, Germany

Filed July 18, 1973, Ser. No. 380,289
Claims priority, application Germany, July 24, 1972, 2236231
Int. Cl. F27b *9/14*
U.S. Cl. 432—137 **5 Claims**



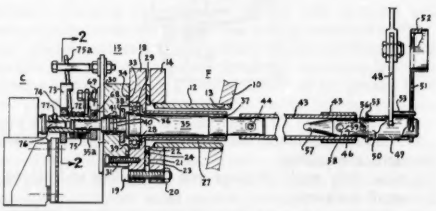
1. In a tunnel kiln of the type having a firing channel and adapted to be heated with gaseous, atomized or gasified liquid fuel and which directly contacts the ware disposed on the stacking surface of a movable kiln vehicle which passes therethrough, and wherein the fuel is supplied to at least one horizontally arranged pair of burners disposed in the lower part of the kiln and which extends from the lateral limits of the tunnel kiln towards each other, each pair of burners burning in firing channels defined by partitions disposed underneath the stacking surface of the kiln vehicle as the vehicle passes through the firing zone in the tunnel kiln, the improvement which comprises: the at least one horizontally arranged pair of burners are offset, with respect to each other, along the direction of travel of the kiln vehicle in the tunnel kiln, by a distance equal to at least the thickness of the partition between the firing channels and at most equal to the clearance firing channel width.

3,874,845

CONTROL OPERATOR

William J. Metalsky, Warminster, and William A. Reynolds, Philadelphia, both of Pa., assignors to Abar Corporation, Feasterville, Pa.

Filed Apr. 24, 1974, Ser. No. 463,433
Int. Cl. F27b *9/04*
U.S. Cl. 432—266 **10 Claims**



1. Control mechanism for use with a vessel having the interior and exterior subject to temperature and pressure differentials comprising

a tubular mounting member fixedly mounted to and through a wall of the vessel,

a supporting member detachably secured to said mounting member and having a sleeve extending therefrom and within the tubular mounting member,

a shaft member rotatably carried in said supporting member,

said shaft member having a portion extending within said sleeve and inwardly therebeyond with a hollow tubular extension,

an actuator for said shaft member supported within the vessel including an arm detachably connected to said tubular extension,

a control element,

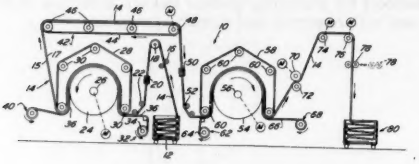
a resilient connection between said shaft member and control element for restoring said actuator to a predetermined position, and

members for preventing gaseous leakage along said shaft and with respect to said supporting member.

3,874,846
TRANSFER PRINTING METHOD

John M. Ashe, 1078 Corn Crib Dr., Huntingdon Valley, Pa. 19006

Filed June 20, 1973, Ser. No. 371,640
Int. Cl. D06p *3/24, 3/52*; B41m *5/26*
U.S. Cl. 8—2.5 7 Claims



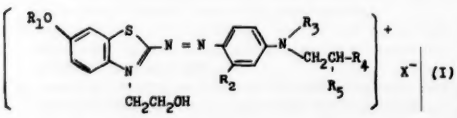
1. A method of printing a fabric comprising the steps of providing a web of double knit heat-set fabric which is substantially oil free gray goods having a weight of between 6 and 14 ounces per yard, feeding said web of fabric, providing a web of paper having a subliming ink pattern and background color thereon, feeding said web of paper so that the webs are in frictional contact with one another, transfer printing said ink pattern and background color from the web of paper to one face of said web of fabric while the moving webs are taut and subjected to heat and pressure at a first printing station, providing a second web of paper having subliming ink pattern and background color thereon, feeding said second web of paper so as to be juxtaposed to the opposite face of the web of fabric, transfer printing the ink pattern and background color on said second web of paper to said opposite face of said web of fabric while the web of fabric and second web of paper are taut and subjected to heat and pressure at a second printing station, and then collecting the web of fabric which has been printed on opposite faces thereof at a receiver.

3,874,847
PROCESS FOR DYEING ACID-MODIFIED POLYESTER FIBERS AND NOVEL THIAZOLEAZO-TYPE CATIONIC DYES

Masaaki Ohkawa, Takatsuki; Seizo Konishi, Minoo; Sadaharu Abeta, Toyonaka and Tetuo Okaniwa, Minoo, all of Osaka, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Aug. 21, 1973, Ser. No. 390,265
Claims priority, application Japan, Aug. 30, 1972, 47-86996; May 31, 1973, 48-61530; May 31, 1973, 48-61531
Int. Cl. D06p *3/76*
U.S. Cl. 8—41 C 8 Claims

1. A process for dyeing acid-modified polyester fibers with a cationic dye, comprising contacting said polyester fibers with a dye bath containing a cationic dye compound of the Formula (I),



(I)

wherein R_1 is a one to two carbon atoms alkyl group, R_2 is a hydrogen atom, a one to two carbon atoms alkyl group or a one to two carbon atoms alkoxy group, R_3 is a one to two carbon atoms alkyl group, R_4 is a hydrogen atom or a one to two carbon atoms alkyl group, R_5 is a hydroxyl group or a one to two carbon atoms alkoxy group, and X^- is an anion.

3,874,848
PROCESS FOR TREATING NON-KERATIONS MATERIAL WITH A POLYTHIOL RESIN AND AN AMINOPLAST AND THE PRODUCT OBTAINED

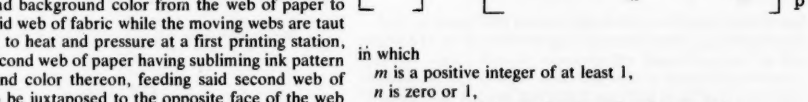
Derek James Rowland Massy, Linton, and Kenneth Winterbottom, Whittlesford, both of England, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 156,052, June 23, 1971, abandoned. This application May 16, 1973, Ser. No. 360,874
Claims priority, application Great Britain, July 2, 1970, 32240/70
Int. Cl. D06c *29/00*
U.S. Cl. 8—115.6 19 Claims

1. A process for modifying hydroxy-containing cellulosic fibres which comprises

1. treating the fibres, free from keratinous material,

A. with a polythiol having up to six thiol groups per molecule and a molecular weight between about 400 and about 10,000, wherein the polythiol has the formula



in which

m is a positive integer of at least 1,

n is zero or 1,

p is a positive integer of at least 2 and at most 6,

q is zero or a positive integer of four or less, selected so that (*p*+*q*) equals at least 2 and at most 6,

each alkylene group contains a chain of at least 2 and at most 6 carbon atoms between consecutive oxygen atoms,

R is an aliphatic radical containing at least 2 carbon atoms, and

X is an aliphatic radical containing at least one thiol group, and

B. with an aminoplast which is free from ethylenic unsaturation, and

2. curing the polythiol and the aminoplast on the fibres.

3,874,849
METHOD OF DRY CLEANING USING LIPOPHILIC CELLULOSE SPONGES

James Teng, and Marcella C. Stubits, both of St. Louis, Mo., assignors to Anheuser-Busch Incorporated, St. Louis, Mo.

Division of Ser. No. 220,393, Jan. 24, 1972, Pat. No. 3,819,390. This application Dec. 21, 1972, Ser. No. 317,104
Int. Cl. D06l *1/02*
U.S. Cl. 8—142 2 Claims

1. A method of dry cleaning comprising the step of applying a dry cleaning solvent to a lipophilic cellulose fatty acid ester sponge having a bulk density of about 0.05 g/cm³ to about 0.3 g/cm³ wherein the cellulose fatty acid ester has a degree of substitution of about 1.2 to about 2.9 and a chain length of about 8 to about 18 carbon atoms, said sponge having particular affinity for absorption of non-polar solvents and oils, working the cleaner filled sponge onto a stained surface, applying cleaner from the sponge to the stained surface to loosen the stain, absorbing the stain into the sponge, and removing the sponge containing the stain material from the cleaned surface.

3,874,850

BLOOD ANALYZING METHOD AND APPARATUS

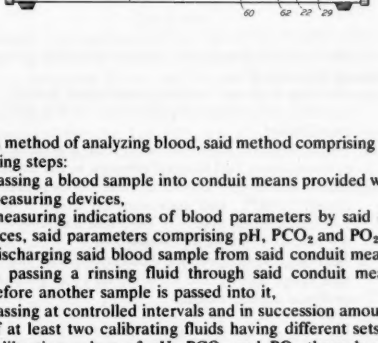
Soren Kai Sorensen, Albertslund; Jorgen Andersen, Herlev; Ebbe Johansen, and Jorgen Aage Preben Lund, both of Birkerod, all of Denmark, assignors to Radiometer A/S, Copenhagen, Denmark

Filed Nov. 15, 1972, Ser. No. 306,661

Claims priority, application Denmark, July 24, 1972, 3662/72

Int. Cl. G01n *27/42, 33/16*

U.S. Cl. 23—230 B **48 Claims**



1. A method of analyzing blood, said method comprising the following steps:

a. passing a blood sample into conduit means provided with measuring devices,

b. measuring indications of blood parameters by said devices, said parameters comprising pH, PCO_2 and PO_2,

c. discharging said blood sample from said conduit means,

d. passing a rinsing fluid through said conduit means before another sample is passed into it,

e. passing at controlled intervals and in succession amounts of at least two calibrating fluids having different sets of calibration values of pH, PCO_2 and PO_2 through said conduit means,

f. measuring said sets of calibration values with the measuring devices,

g. controlling the operational sequence of the steps (b) through (f) by control means,

h. storing said sets of calibration values received from said measuring devices; and (i) converting said measured indications into easily interpreted units on the basis of the calibration values.

3,874,851

METHOD AND APPARATUS FOR THE DETECTION OF MICROFILARIAE

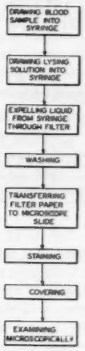
Robert John Wilkins, 339 E. 58th St., New York, N.Y. 10022, and Arthur Hurvitz, 4370 Kissena Blvd., Flushing, N.Y. 11355

Filed Nov. 15, 1973, Ser. No. 416,320

Int. Cl. G01n *33/16, 1/30*

U.S. Cl. 23—230 B **10 Claims**

1. In the detection of microfilariae wherein a blood sample is drawn into a syringe, the blood mixed with an aqueous lysing solution, filtered through a pad, the filter pad stained and examined on a glass slide under a microscope, the improvement which comprises mixing said lysing solution with said blood by drawing said lysing solution into said blood-containing syringe, and discharging the mixture through said



filter pad, the blood sample thereby being minimally exposed for contamination.

3,874,852

REAGENT AND METHOD FOR DETERMINING LEUKOCYTES AND HEMOGLOBIN IN THE BLOOD

Thomas E. Hamill, Fort Lauderdale, Fla., assignor to Coulter Diagnostics, Inc., Hialeah, Fla.

Filed July 5, 1974, Ser. No. 485,931

Int. Cl. G01n *33/16*

U.S. Cl. 23—230 B **8 Claims**

1. A reagent for use in the determination of leukocytes and hemoglobin in the blood, which comprises a ferricyanide ion-free aqueous solution containing a quaternary ammonium ion and cyanide ion, said quaternary ammonium ion having attached to nitrogen three short chain alkyl groups and one long chain alkyl group, and said ions being present in amounts sufficient to stromatolyse erythrocyte and platelet cells and to convert hemoglobin to a chromogen for said determinations.

3,874,853

PROCESS FOR DETERMINING THE CONCENTRATION OF INORGANIC PHOSPHATES IN HUMAN FLUIDS

Ronald K. Byrnes, Brockton, Mass., assignor to Damon Corporation, Needham, Mass.

Filed Nov. 16, 1972, Ser. No. 307,059

Int. Cl. G01n *33/16*

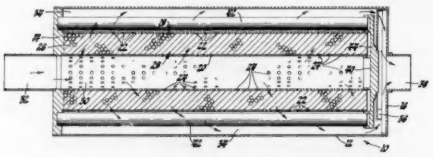
U.S. Cl. 23—230 B **4 Claims**

1. In a process for determining the concentration of inorganic phosphate in human fluids wherein a test sample of a human fluid is treated with an acidic aqueous solution of ammonium molybdate to form a reducable phosphomolybdate complex in a first step and reacting said complex with a basic aqueous solution of a reducing agent to form a reaction product capable of absorbing electromagnetic radiation in accordance with Beer's law and wherein the electromagnetic radiation absorbance of said reaction product is measured, the improvement which comprises forming a blank sample of said human fluid by admixing said human fluid in a container separate from said test sample first with the basic aqueous solution and thereafter with all the other reagents added to the test sample under conditions such that the final blank sample has a pH higher than that at which the phosphomolybdate is formed while retaining all reagents in solution and comparing the electromagnetic radiation absorbance of the blank sample with the electromagnetic radiation absorbance of said reaction product in the test sample.

3,874,854
CATALYTIC CONVERTER

Joseph E. Hunter, Jr., Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 1, 1973, Ser. No. 328,682
Int. Cl. F01N 3/14; B01J 9/04
U.S. Cl. 23—288 F **3 Claims**

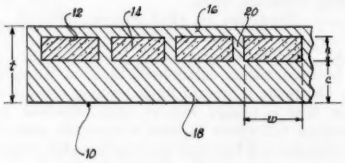


1. In a catalytic converter for the treatment of automotive exhaust gases, a housing having an exhaust gas inlet communicating with an inlet plenum interiorly of said housing, an exhaust gas outlet communicating with an outlet plenum interiorly of said housing, and a catalytic element disposed between said inlet and said outlet plenums such that said exhaust gases passing from said inlet to said outlet are caused to pass through said catalytic element and be treated therein; the improvement consisting of, a plurality of sealed containers supported only in said outlet plenum in spaced apart relationship with respect to each other and said catalytic element to enable treated exhaust gases to flow over and around said containers, a fusible material in said containers, said material having a melting point in the range of about 400° to 900° F. and a latent heat of fusion of at least about 10,000 BTU per cubic foot, said material being operative to absorb at least a portion of the sensible heat of the treated gases passing from said catalytic element to said outlet during converter operation and to release at least a portion of the absorbed heat to said catalytic element during periods of non-operation thereby serving to decrease the rate of heat loss from said element during said periods of non-operation, and being used in sufficient quantity to maintain the catalyst at operating temperature during desired periods of non-operation.

3,874,855
COMPOSITE SHOCK RESISTING BODIES

Robert Legrand, Paris, France, assignor to Cegedur GP, Paris, France

Continuation-in-part of Ser. No. 843,546, July 22, 1969, abandoned. This application Nov. 21, 1973, Ser. No. 418,108
Int. Cl. E41H 5/04
U.S. Cl. 29—191.2 **2 Claims**

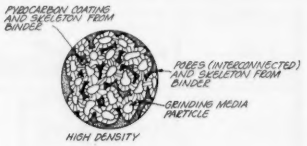


1. An armor plate comprising a composite product consisting of a wrought aluminum alloy body, a plurality of cells defined by said body, and a material of high hardness filling said cells, said body providing a wall portion subject to impact and adapted to be pierced while absorbing a portion of the energy of the impact, the thickness of said wall portion comprising about 10 to 30 percent of the thickness of said body, said hard material and the remainder of said body absorbing the balance of the energy of the impact, said cells comprising from 30 to 50 percent of the cross sectional area of said body, and said body defining a thick wall portion on the side of said cells opposite said thin wall portion, the thickness of said thick wall portion being from 40 to 60 percent of the thickness of said body.

3,874,856
POROUS COMPOSITE OF ABRASIVE PARTICLE IN A PYROLYTIC CARBON MATRIX AND THE METHOD OF MAKING IT

Donald H. Leeds, Rolling Hills, Calif., assignor to Ducommun Incorporated, Los Angeles, Calif.

Continuation-in-part of Ser. No. 9,917, Feb. 9, 1970, abandoned. This application Feb. 26, 1973, Ser. No. 336,029
Int. Cl. B24d 3/10, 3/18, 3/32
U.S. Cl. 51—296 **10 Claims**


PYROCARBON COATING AND SKELETON FROM BINDER
PORES (INTERCONNECTED) AND SKELETON FROM BINDER
GRINDING MEDIA PARTICLE
HIGH DENSITY

1. The method of making a porous composite product comprising the steps of:

a. forming a green product comprising spaced abrasive particles and a metal graphitization catalyst held together by a binder;

b. pyrolyzing said binder so as to form a skeletal network;

c. maintaining said skeletal network in the presence of a carbonaceous gas, at a temperature of between approximately 1,900°F. and approximately 2,300°F. to form a pyrolytic carbon matrix to hold said particles in place in the porous composite product; and

d. heat treating the product thus formed over the temperature range from 2,375°F. to 3,100°F. to graphitize said pyrolytic carbon matrix.

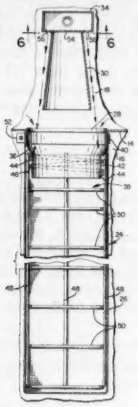
3,874,857
APPARATUS FOR FILTERING PARTICULATE MATTER FROM GAS AND HAVING REVERSE FLOW CLEANING MEANS

David H. Hunt, Simsbury; Raymond J. Allain, Hebron, and Joseph E. Maselek, Rocky Hill, all of Conn., assignors to The Spencer Turbine Company, West Hartford, Conn.

Filed Jan. 7, 1974, Ser. No. 431,149
Int. Cl. B01d 46/04
U.S. Cl. 55—302 **7 Claims**

1. In an apparatus for filtering particulate matter from a gaseous stream, the combination comprising an axially elongated flexible tubular-shaped gas permeable filter element having a clean gas outlet opening at one end thereof, a substantially gas impervious frustroconical diffuser, means for supporting said diffuser externally of said filter element and in generally coaxial alignment with and axially spaced relation to said outlet opening, said diffuser diverging in the direction of said outlet opening and having a major diameter substantially smaller than the diameter of said outlet opening, and means comprising a plenum chamber having a generally radially disposed wall facing in the direction of and axially spaced from said one end and having a plurality of gas passageways opening therethrough for directing a plurality of streams of gas from said plenum chamber toward the outer peripheral surface of said diffuser near the smaller end thereof and in the

direction of said outlet opening, whereby said gas streams travel generally along a path defined by said outer peripheral



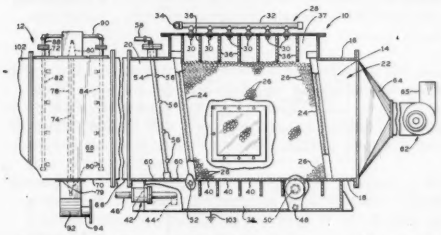
surface and into and through said outlet opening and into said filter element.

3,874,858

METHOD AND APPARATUS FOR ELECTROSTATIC REMOVAL OF PARTICULATE FROM A GAS STREAM

Warren L. Klugman, Berea, and Jerome Kosmider, Strongsville, both of Ohio, assignors to The Ceilcote Company, Berea, Ohio

Continuation of Ser. No. 165,209, July 22, 1971, abandoned. This application July 11, 1973, Ser. No. 378,278
Int. Cl. B03c *3/78*
U.S. Cl. 55—118 3 Claims



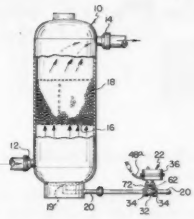
1. Apparatus for removing particulate matter from a gas stream comprising: a housing having inlet and outlet ends and wall means defining a horizontal gas flow path between said ends, said housing being of generally uniform cross-sectional dimension between said ends, horizontally spaced apart grid means in said housing between said ends and defining a contact chamber with said wall means, said contact chamber containing only randomly oriented packing elements of dielectric material, said elements together occupying the space between said wall means and grid means and defining a porous mass having a horizontal top surface, irrigating liquid discharge means in said housing overlying said top surface for distributing irrigating liquid across said surface for flow by gravity downwardly through said contact chamber and through and in contact with said packing elements, a sump beneath said contact chamber to receive irrigating liquid flowing through said contact chamber, a pump for recirculating irrigating liquid from said sump to said discharge means, a plurality of generally parallel electrodes in said housing providing a particle charging section between said inlet end and said contact chamber, said electrodes being spaced apart transverse to the direction of gas flow through said housing, first alternate ones of said electrodes being wires connected to a source of direct current and second alternate ones of said electrodes being connected to ground, means to flow liquid onto said electrodes to clean the electrodes, means electrically grounding said housing to maintain said irrigating liquid and packing elements electrically neutral, and means causing said gas to flow past said electrodes and thence through said contact chamber transverse to the direction of irrigating liquid flow therethrough.

3,874,859

AUTOMATIC DRAIN DEVICE FOR DELIQUESCENT GAS DRYERS

Martin C. Krause, Wattsburgh, Pa., assignor to Van-Air Incorporated, Erie, Pa.

Filed Dec. 19, 1973, Ser. No. 426,076
Int. Cl. B01d *33/38*
U.S. Cl. 55—218 9 Claims



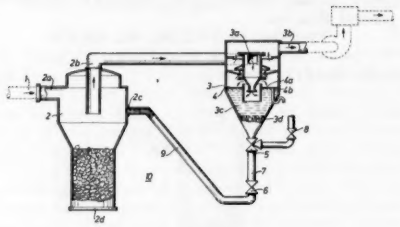
1. A compact control unit operative for automatically controlling a flow of liquid in combination with an enclosed vessel, said vessel including means adapted for removing moisture from pressurized gas passed through said vessel, said vessel having a drain opening in the lower portion thereof for draining liquid therefrom, means connecting said control unit in liquid transmitting relation with said drain opening, for controlling the egress of liquid from said vessel, said control unit comprising liquid conveying means, said liquid conveying means comprising an inlet communicating with said connecting means and an outlet, and valve means coacting with said liquid conveying means for controlling the flow of liquid through said liquid conveying means, electrically powered motor means for actuating said valve means to move said valve means from a closed position to an open position and then back to a closed position upon predetermined energization of said motor means, means including electrical circuitry for automatically controlling energization of said motor means at predetermined intervals of time, a housing for said energization controlling means, means releasably coupling said motor means to said valve means for actuation of the latter by said motor means, said valve means and liquid conveying means being spaced from and disposed exteriorly of said housing whereby said valve means and said liquid conveying means are readily accessible, exteriorly accessible attaching means holding said liquid conveying means and valve means assembly in assembled relation with said motor means and associated energization controlling means, said attaching means being readily accessible and operable for quickly removing said motor means and said energization controlling means from said liquid conveying means and valve means assembly, said releasable coupling means providing for convenient manual actuation of said valve means in the event of removal of said motor means from coupled coaction with said valve means, and said attaching means including means which not only holds said motor means and associated energization controlling means to said liquid conveying means and valve means assembly but also is operable to hold the latter in assembled relation and which upon predetermined actuation permits quick removal and replacement of said valve means said liquid

conveying means without disconnecting the latter from said drain opening connecting means.

3,874,860
APPARATUS FOR SEPARATING PARTICULATE MATTER FROM A FLOWING MEDIUM

Bertil Sven Vilhelm Larsson, Johanneshov, Sweden, assignor to Aktiebolaget Svenska Flaktfabriken, Nacha, Sweden

Filed Mar. 29, 1973, Ser. No. 346,185
Claims priority, application Sweden, Apr. 10, 1972, 4595/72
Int. Cl. B01d *47/02*
U.S. Cl. 55—244 **5 Claims**



1. Apparatus for separating particulate matter from a gaseous medium, comprising:
- a coarse particle separator having an inlet, an outlet, a separating zone, and a collecting chamber below the separating zone;
- a fine particle separator having an inlet, an outlet, a separating zone, and a collecting chamber below the separating zone;
- means for wetting particulate matter in said fine particle separator;
- main conduit means connecting the outlet of said coarse particle separator with the inlet of said fine particle separator;
- means for flowing the medium through said separators and creating in the separating zone of said coarse particle separator a sub-atmospheric pressure;
- return conduit means connecting the collecting chamber of said fine particle separator with the separating zone of said course particle separator;
- feed valve means connected in said return conduit means; discharge valve means connected in said return conduit means downstream of said feed valve means to cooperate therewith for defining another collecting chamber in said return conduit; and
- vent means connected to said return conduit for selectively admitting and blocking atmospheric air pressure to said return conduit collecting chamber,
- so that when said feed valve is closed and said discharge valve and vent are open, wetted particulate matter contained in the return conduit collecting chamber is conveyed pneumatically to the coarse particle separator.

3,874,861
METHOD OF PRODUCING FOAMED GLASS

Fredrik Wilhelm Anton Kurz, Nysatravagen 12, Lidingo, Sweden

Continuation of Ser. No. 117,717, Feb. 22, 1971, abandoned. This application Aug. 20, 1973, Ser. No. 389,440
Claims priority, application Sweden, Feb. 26, 1970, 2553/70
Int. Cl. C03b *19/08*
U.S. Cl. 65—20 **15 Claims**

1. A method of producing inorganic foamed glass of a density below 0.2 which comprises mixing in glass forming proportions mineral powders which are amorphous and which contain metal oxides comprising not more than 3% CaO and capable of making glass chemically and mechanically resistant and have a specific surface area of at least 3000 cm^2/g with gas forming agents and alkali metal silicate and heating the mixture at 750°- 950°C. to form a glass by reaction of said mineral powders with the alkali metal silicate and to expand and foam the resulting glass, the proportion of mineral powder to alkali silicate in said mixture being from 2/1 to 1/3, wherein the alkali metal silicate in the foamed glass is insoluble and the alkali content of the foamed glass being not more than 15% by weight.

3,874,862
MOLD RELEASE COMPOSITION FOR MOLTEN GLASS AND METHOD OF APPLICATION

Archie L. Bickling, Jr.; Richard E. Brown; Kent G. Roller, and Thomas J. Loran, all of Boulder, Colo., assignors to Ball Brothers Research Corporation, Boulder, Colo.

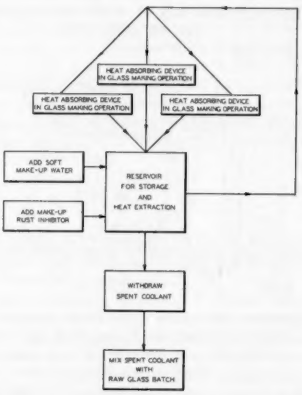
Filed Dec. 13, 1973, Ser. No. 424,260
Int. Cl. C03b *39/00*
U.S. Cl. 65—26 **27 Claims**

1. A release and lubricating composition comprising a dispersion of a mixture of a solid lubricant, a carrier, a binder, and a s-triazinyl derivative.

3,874,863
METHOD FOR RENEWING A GLASS MAKING OPERATION COOLANT

Casmir F. Mochon, Toledo; Joseph E. Poley, Rossford, and Donald E. Shamp, Millbury, all of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Jan. 14, 1974, Ser. No. 432,987
Int. Cl. C03b *1/00*
U.S. Cl. 65—27 **6 Claims**

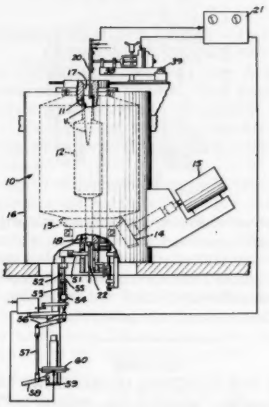

HEAT ABSORBING DEVICE IN GLASS MAKING OPERATION
HEAT ABSORBING DEVICE IN GLASS MAKING OPERATION
HEAT ABSORBING DEVICE IN GLASS MAKING OPERATION
ADD SOFT MAKE-UP WATER
ADD MAKE-UP RUST INHIBITOR
RESERVOIR FOR STORAGE AND HEAT EXTRACTION
WITHDRAW SPENT COOLANT
MIX SPENT COOLANT WITH RAW GLASS BATCH

1. A method for renewing a coolant comprised of tap water and a rust inhibiting agent contained in a closed system, whose hardness has increased beyond acceptable limits from use in cooling devices employed in a glass making operation, by using measured quantities thereof in a batch of raw glass making materials, comprising the steps of:
- a. drawing off measured quantities of coolant from the closed system;
- b. mixing said measured quantities of drawn off coolant with pulverized raw glass making materials to form a batch; and
- c. adding measured quantities of soft water to the coolant remaining in the system for reducing the hardness content thereof.

3,874,864
GLASSMAKING DIAMETER SENSING

Homer D. Peters, Sylvania, and Robert R. Rough, Toledo, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Apr. 16, 1973, Ser. No. 351,458
Int. Cl. C03b 5/00
U.S. Cl. 65—29 2 Claims



1. In the process of refining molten glass wherein unrefined molten glass is continuously introduced into one end of an open-ended chamber, the chamber is continuously rotated to form a void in the molten glass, said void having an inclined surface and causing the gaseous inclusions to be removed from the glass to the void by the action of centrifugal force and the molten glass is continuously removed from the other end of the rotating chamber, the method of controlling the volume of glass in the chamber which comprises:

positioning a movable probe within the rotating container, said probe comprising concentric tubes positioned relative to each other to provide an annular pressure passage and a central pressure sensing passage;

moving the probe toward a point on the surface of the void while supplying air flowing under a constant pressure through the annular pressure passage;

directing said air flow from the annular pressure passage toward the surface of the rotating molten glass at a surface of the void and

sensing by return flow of air a predetermined change in air pressure in the probe as the probe apparatus approaches a predetermined position with respect to the surface of the void;

continuously determining this difference in air pressure between the redirected air pressure in the sensing tube and the pressure of the constant pressure air supplied to the glass surface through the annular pressure passage;

continuously comparing the pressure differences between the flows within a preselected range of pressure differences;

operably and movably connecting said probe to a diaphragm motor; said motor having an air activatable diaphragm which divides the motor into two chambers; supplying air to one chamber of the diaphragm motor and countering the diaphragm movement by a pressure spring in opposition to the force of the air pressure supplied to the chamber of the diaphragm motor;

controlling the air pressure supplied to the diaphragming motor so as to move the diaphragm against the spring and thereby continually urging the probe towards the surface of the rotating glass mass so as to keep the constant pressure stream within redirecting range of the surface of the molten mass;

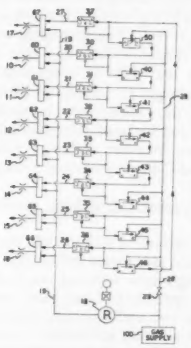
positioning a chamber flow control device within the outlet of the rotatable chamber; and

operably connecting the flow control device so as to respond to any difference in pressure between the constant air pressure applied to the glass surface and the returned sensed air pressure which is outside the range of preselected pressure differences so as to move the flow control device to continually regulate the size of the exit of the chamber thereby regulating the volume of the molten glass within the chamber in response to the changes in air pressure differences directed towards the molten glass surfaces whenever the surface of the void changes to a location outside of the preselected range of pressure differences.

3,874,865
APPARATUS FOR SELF-CONTROLLING GASEOUS BUBBLER SYSTEM IN A GLASS MELTING FURNACE

Mario Cuniberti, Columbus, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Oct. 15, 1973, Ser. No. 406,497
Int. Cl. C03b 5/18
U.S. Cl. 65—161 5 Claims

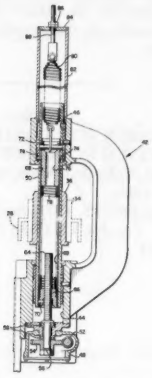


1. In apparatus for delivering a gaseous medium to a plurality of bubbler nozzles in a glass melting furnace, wherein a first pressure source of said gaseous medium is connected to a first gas carrying means to conduct the flow of said gaseous medium to said nozzles and wherein a pressure regulating means is provided to balance said first pressure with the pressure head of glass over said nozzles in said glass furnace, the improvement comprising a supply of said gaseous medium at a second pressure greater than said first pressure, and an automatically controllable gas delivery system actuated by said supply of gas to direct volumes of said gaseous medium at said second pressure to each of said plurality of bubbler nozzles in a predetermined sequence and for predetermined lengths of time.

3,874,866
GLASS FEEDER TUBE OPERATING MECHANISM

Michael A. Iacovazzi, Bristol, and Aldo Basile, West Hartford, both of Conn., assignors to Emhart Corporation, Bloomfield, Conn.

Continuation of Ser. No. 351,763, April 16, 1973, abandoned. This application Apr. 8, 1974, Ser. No. 458,812
Int. Cl. C03b 5/26
U.S. Cl. 65—164 12 Claims



1. In a feeder apparatus for handling molten glass and including a feeder bowl with a lower outlet spout defined in part by an annular curb over which the molten glass is adapted to flow in response to vertical reciprocating motion of a plunger, and including a rotatable refractory tube arranged coaxially with the plunger and with its lower and spaced above the annular curb to a height H to define an annular passageway for the molten glass, the improvement comprising:

a. support means for said rotatable tube, including a C-shaped frame member defining vertically spaced slide bearings, said C-shaped member having an upper end and a lower end,

b. a tubular support rod slidably received in said spaced bearings,

c. a cross arm carried by said rod and disposed between said upper end and said lower end of said C-shaped member, and including means adjacent one end for rotatably supporting the upper end of said tube, and a motor adjacent the opposite end and drivingly connected to said tube, said cross arm being supported by said rod so that the weight of said motor substantially balances that of the tube,

d. a threaded shaft coaxially arranged in the lower end of said support rod and journalled in the C-shaped frame,

e. nut means threadably received on said shaft and connected to said support rod for moving said rod vertically in response to rotation of said threaded shaft, and

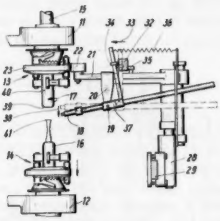
f. means for rotating said threaded shaft and varying the height, H.

3,874,867
APPARATUS FOR PRODUCING VIALS

Hans-Joachim Dichter, Sachsendamm 93 1 Berlin 62, Germany

Filed July 6, 1973, Ser. No. 377,132
Claims priority, application Germany, July 7, 1972, 2234063
Int. Cl. C03b 23/04
U.S. Cl. 65—271 5 Claims

1. A machine for producing glass vials from glass tubes comprising rotatable support means including upper and lower radially extending arms having aligned coaxial pairs of upper and lower chucks arranged on the outer ends thereof, said support means and chucks being rotatable past a plurality of work performing stations, glass tubes extending vertically between and being engageable by said upper and lower chucks, and said chucks being vertically movable for forming vials from said tubes, burner means including a rod arranged



on said machine and extending generally at right angles to and intermediate said upper and lower chucks, and means for moving said chucks relatively to draw said tubes and whereby heat from said burner rod means is uniformly applied to said tubes to permit softening thereof and separation into vials having closed bottoms and neck portions.

3,874,868
AZIDE FOR CONTROL OF BEGGARWEED

Charles M. Chandler, Columbus, Ga., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 17, 1973, Ser. No. 351,901
Int. Cl. A01n 11/00
U.S. Cl. 71—65 9 Claims

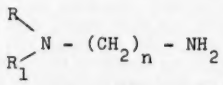
1. The method of controlling Florida beggarweed in peanut cropland which comprises applying to said cropland in advance of pegging and at a time between emergence of said weed and development of beggarweed plants about 3 inches tall an amount of a stable azide having its cation selected from the group consisting of potassium, sodium, hydrogen, calcium and ammonium effective to control said beggarweed without causing substantial permanent damage to said peanuts.

3,874,869
ANTIMICROBIAL AGENTS FOR WATER CONSERVATION

Gunter Koppensteiner, Hilden, Rhineland; Hans-Werner Eckert, Dusseldorf, and Volker Wehle, Hilden, all of Germany, assignors to Hendel & Cie GmbH, Dusseldorf, Germany

Filed Apr. 20, 1973, Ser. No. 352,941
Claims priority, application Germany, Apr. 24, 1972, 2220026; Mar. 22, 1973, 2314221
Int. Cl. A01n 9/00, 9/02
U.S. Cl. 71—67 16 Claims

1. A process for the prevention of the growth of microorganisms in an aqueous environment which consists essentially of contacting said microorganisms with an amount effective to prevent the growth of said microorganisms of a reaction product of ϵ-caprolactam with an N-alkylalkylenediamine of the formula



wherein R is selected from the group consisting of alkyl of 10 to 18 carbon atoms, hydroxyalkyl of 10 to 18 carbon atoms, alkenyl of 10 to 18 carbon atoms, hydroxyalkenyl of 10 to 18 carbon atoms, alkadienyl of 10 to 18 carbon atoms, alkatrienyl of 10 to 18 carbon atoms, and mixtures of alkyl derived from fatty acid mixtures of 10 to 18 carbon atoms, R_1 is a member selected from the group consisting of hydrogen and

alkyl of 1 to 4 carbon atoms, and n is an integer from 2 to 6, with the molar ratio of N-alkylalkylenediamine to ε-caprolactam ranging from 1:1 to 1:10 and said reaction being carried out for 3 to 20 hours in the liquid phase at a temperature above 180°C.

3,874,870

MICROBIOCIDAL POLYMERIC QUARTERNARY AMMONIUM COMPOUNDS

Harold A. Green, Havertown, Pa.; John J. Merianos, Jersey City, and Alfonso N. Petrocci, Glen Rock, both of N.J., assignors to Mill Master Onyx Corporation, New York, N.Y.

Filed Dec. 18, 1973, Ser. No. 425,931

Int. Cl. A01N *9/20, 9/24;* **A61K** *15/00, 17/00*

U.S. Cl. 71—67 **8 Claims**

1. A method of controlling the proliferation of deleterious microorganisms selected from the group consisting of bacteria and algae in an aqueous system, which comprises applying to said microorganisms a bacteriacidally or algaecidally effective amount of a condensation product formed by mixing 1,4-bisdimethylamino-2-butene dissolved in a solvent with 1,4-dihalo-2-butene at room temperature whereby an exothermic reaction is obtained causing the temperature of the mixture to rise, then maintaining the mixture at no higher than reflux temperature until the reaction is complete,

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3,874,871

PRESERVING COMPOSITIONS FOR CUT FLOWERS

Max-Heinz Sy, and Bernd-Dieter Holdt, both of Dusseldorf, Germany, assignors to Henkel & Cie GmbH, Dusseldorf-Halthausen, Germany

Filed Aug. 18, 1971, Ser. No. 172,866

Claims priority, application Germany, Aug. 27, 1970, 2042400

Int. Cl. A01n *3/02*

U.S. Cl. 71—68 **8 Claims**

1. A preserving composition for cut flowers consisting essentially of from 30 to 45 parts by weight of monosaccharides, from 1 to 5 parts by weight of a water-soluble aluminum salt, from 0.01 to 0.5 parts by weight of boric acid, and from 0.5 to 2 parts by weight of a water-soluble germicide evolving formaldehyde in aqueous solution selected from the group consisting of condensation products of formaldehyde and monoethanolamine, and N-methylol compounds of chloroalkanoic acid amides having from two to six carbon atoms.

3,874,872

PROCESS FOR INCREASING SUGAR YIELD IN SUGAR CANE

Robert Howard Kupelian, Yardley, Pa., assignor to American Cyanamid Company, Stamford, Conn.

Filed Mar. 2, 1973, Ser. No. 337,327

Int. Cl. A01n *9/36*

U.S. Cl. 71—86 **5 Claims**

1. A method for increasing sugar yield in field grown, ripening sugar cane comprising the step of: applying to said sugar cane about 2 to 10 weeks prior to harvest at a rate equivalent to form about 1 pound per acre to about 10 pounds per acre of the compound:

a. phosphonic acid, (2,2,2-trichloro-1-hydroxyethyl)-bis-[2-(2-hydroxypropoxy)-1-methylethyl] ester;

b. phosphonic acid, (2,2,2-trichloro-1-hydroxyethyl)-bis-[2-(2-hydroxyethoxy)ethyl] ester;

c. phosphonic acid, (2,2,2-trichloro-1-hydroxyethyl)-,2-(2-hydroxypropoxy)-1-methylethyl ester, diester with 1,1'-oxydi-2-propanol; or

d. phoshonic acid, (2,2,2-trichloro-1-hydroxyethyl)-, 2-(2-hydroxyethoxy)ethyl ester, diester with diethylene glycol.

3,874,873

HERBICIDAL COMPOSITIONS BASED ON 1,2,3-THIADIAZOL-5-YL UREAS

Gert Paul Volpp, Princeton, and Harry Dounchis, Lawrence, both of N.J., assignors to FMC Corporation, New York, N.Y.

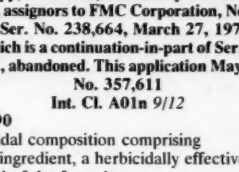
Division of Ser. No. 238,664, March 27, 1972, Pat. No. 3,787,434, which is a continuation-in-part of Ser. No. 156,125, June 23, 1971, abandoned. This application May 7, 1973, Ser. No. 357,611

Int. Cl. A01n *9/12*

U.S. Cl. 71—90 **4 Claims**

1. A herbicidal composition comprising

a. as active ingredient, a herbicidally effective amount of a compound of the formula:



where A is lower alkyl or alkenyl radical of up to four carbon atoms; B is —H or $-CH_3$, with the proviso that B is —H when A is other than $-CH_3$; X is oxygen or sulfur; Y is —OR, —NHR, —NRR′, —NH—NH_2 or

in which R and R′ are alkyl, alkenyl, alkynyl, cycloalkyl, hydroxyalkyl, or alkoxyalkyl groups containing up to 12 carbon atoms, and in which R and R′ may be the same or different; Z is —O—, $-CH_2-$ or absent; and the agriculturally acceptable metallic and amine salts thereof;

b. an inert agricultural carrier; and

C. a surface-active agent.

3,874,874

HERBICIDAL METHOD EMPLOYING THIADIAZOLYL AMIDINES

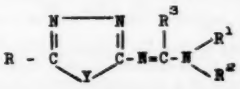
Tony Cebalo, Indianapolis, and Robert Edward Buntrock, Munster, both of Ind., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 87,298, Nov. 5, 1970, Pat. No. 3,784,555. This application Oct. 24, 1973, Ser. No. 409,191

Int. Cl. A01n *9/12*

U.S. Cl. 71—90 **19 Claims**

1. An herbicidal composition comprising an inert carrier and an effective amount of a compound having the following formula

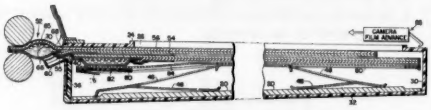


wherein Y represents sulfur, R represents lower alkyl or halogenated lower alkyl and each of R^1, R^2 and R^3 independently represents hydrogen or lower alkyl.

3,874,875
PHOTOGRAPHIC FILM ASSEMBLAGE WITH RESILIENT PAD UNDER PROCESSING SOLUTION CONTAINER

Edwin H. Land, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed June 11, 1973, Ser. No. 368,611
Int. Cl. G03c *1/48;* G03b *19/10*
U.S. Cl. 96—76 C 21 Claims



1. Photographic assemblage for locating at least one film unit in a predetermined location, the one film unit comprising a plurality of layers, including photosensitive and image-receiving layers, and a container of fluid processing composition at one end of the film unit, the fluid being adapted to be distributed between a predetermined pair of layers, said assemblage comprising:

means for urging the one film unit towards the predetermined location, said urging means being positioned so that the one film unit is intermediate the predetermined location and said urging means; and

resilient means positioned between the one film unit and said urging means for preventing direct engagement of said urging means with the one film unit in the area of the container of fluid.

3,874,876
POLYETHYLENE TEREPHTHALATE FILM FOR USE AS SUPPORT OF X-RAY FILM

Noburo Hibino; Kunihira Seto; Teruo Kobayashi, and Kazuo Inoue, all of Minami Ashigara, Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Kanagawa, Japan

Filed Apr. 13, 1973, Ser. No. 350,867
Claims priority, application Japan, Apr. 13, 1972, 47-037274
Int. Cl. G03c *1/84*
U.S. Cl. 96—84 R 13 Claims

1. A polyethylene terephthalate film for use as a support of a silver halide X-ray film comprising polyethylene terephthalate and one or more dyes selected from the group consisting of 1-(2′,6′-dimethylanilino)-4,5,8-trihydroxyanthraquinone, 1-(2′,4′,6′-trimethylanilino)-4,5,8-trihydroxyanthraquinone, 1-(2′,6′-diethylanilino)-4,5,8-trihydroxyanthraquinone and 1-(2′-methyl-6′-ethylanilino)-4,5,8-trihydroxyanthraquinone.

3,874,877
SUBBING METHOD FOR PHOTOGRAPHIC FILM SUPPORT

Takenori Omichi; Teppei Ikeda; Shunich Adachihara, and Mobuo Yamamoto, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed July 25, 1972, Ser. No. 275,002
Claims priority, application Japan, July 30, 1971, 46-57275
Int. Cl. G03c *1/80*
U.S. Cl. 96—87 R 14 Claims

1. A subbing method for a photographic film which comprises applying to the surface of a polyethylene terephthalate film a first layer of a polyamide-epichlorohydrin resin comprising the reaction product of a polyalkylene polyamine and a dibasic carboxylic acid, said first layer not containing a hydrophilic resin and then applying a second layer of a hydrophilic resin onto said polyamide-epichlorohydrin resin layer.

3,874,878
PHOTOGRAPHIC ARTICLE WITH COMPOSITE OXIDATION PROTECTED ANTI-STATIC LAYER

Arthur A. Rasch, Webster, and Wilbur C. Hodges, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 22, 1972, Ser. No. 255,486
Int. Cl. G03c *1/78*
U.S. Cl. 96—87 A 6 Claims

1. In a photographic article comprising a radiation-sensitive material, a flexible hydrophobic polyester film support, hydrophilic colloid coating and a composite subbing layer interposed between and bonded to said film and said hydrophilic colloid coating, the improvement in which said subbing layer is vapor deposited and binderless and comprises

an electrically conductive layer portion exhibiting a surface resistivity of less than 10^{12} ohms per square which is capable of oxidation to a less conductive state and

a protective inorganic oxide layer portion which consists essentially of said inorganic oxide bonded to a major surface remote from said support of said electrically conductive layer portion to retard oxidation thereof; said composite subbing layer having a thickness of less than 100 angstroms and an optical density of at most about 0.5.

3,874,879
ARTICLE WITH OXIDATION PROTECTED ADHESIVE AND ANTI-STATIC LAYER

Arthur A. Rasch, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 22, 1972, Ser. No. 255,487
Int. Cl. G03c *1/78*
U.S. Cl. 96—87 A 12 Claims

1. In a photographic article comprising a radiation sensitive material, a dielectric hydrophobic polymer support, a hydrophilic colloid coating and an adhesive hydrophilic subbing layer which is contiguous to said support and said hydrophilic colloid coating and is bonded to each, the improvement in which said adhesive subbing layer is additionally an anti-static layer exhibiting a surface resistivity of less than 10^{12} ohms per square and is binderless and consists essentially of an intimate blend of

a. a metal electrical conductor capable of oxidation to a less conductive state and at least about 20 weight, based on the weight of said blend of

b. a protective inorganic oxide selected from the group consisting of silicon oxide, magnesium oxide, aluminum oxide, tantalum oxide, titanium oxide, boro-silicon oxide and mixtures thereof; the thickness of said adhesive subbing layer being from about 50 to about 500 angstroms.

3,874,880
PHOTOGRAPHIC ELEMENTS WITH A SUPPORT COMPRISING POLYMERIC PROPYLENE COMPOSITIONS

William J. Venor, Henrietta; John C. Hoppe, Spencerport, both of N.Y., and William W. Blount, Jr., Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 90,053, Nov. 16, 1970, abandoned.
Filed Nov. 24, 1972, Ser. No. 309,304
Int. Cl. G03c *1/76*
U.S. Cl. 96—87 R 11 Claims

1. A photographic element comprising a photographic support coated with at least one layer of a light-sensitive silver halide emulsion, said support being formed from a composition comprising

A. a film-forming crystalline polymer containing at least 90 percent by weight of polymerized propylene, selected from the class consisting of:

1. a block copolymer of propylene with at least one other α-monoolefin selected from the group of

a. ethylene, and
b. α-monoolefin hydrocarbons of 4 to 10 carbon atoms;
2. mixtures of crystalline polypropylene and said block copolymer; and
3. polypropylene;
B. about 15 to about 40 percent by weight talc;
C. about 5 to about 15 percent by weight titanium dioxide pigment;
D. about 5 to about 20 percent by weight of a polyolefin elastomer; and
E. about 1/10 to about 1 percent by weight of a polyolefin antioxidant.

3,874,881

SENSITIZING A MIXTURE OF SILVER HALIDE AND LEAD HALIDE BY HEAT

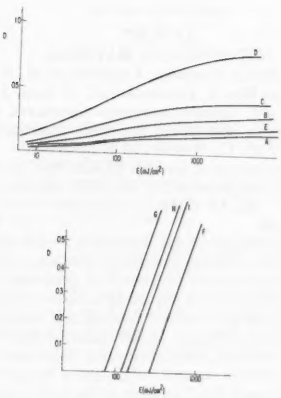
Eiichi Inoue; Hiroshi Kokado, both of Tokyo; Isamu Shimizu, Kanagawa, and Shuichi Ohtsuka, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 12, 1973, Ser. No. 340,631

Claims priority, application Japan, Mar. 14, 1972, 47-25884

Int. Cl. G03c *1/00, 1/28*

U.S. Cl. 96—88 **14 Claims**



1. A method for raising the sensitivity of a mixture of lead halide and silver halide to radiation, which mixture comprises from 20 percent to 80 mol percent lead halide with, correspondingly, 80 to 20 mol percent silver halide, which method comprises annealing said mixture prior to exposure to irradiation, thereby increasing the sensitivity of said mixture to irradiation; wherein

said annealing is conducted in the absence of oxygen at a temperature of from 50° – 600°C for a period of time of from about ½ to about 24 hours.

3,874,882

CATALYST SOLUTION FOR ELECTROLESS DEPOSITION OF METAL ON SUBSTRATE

Michael Gulla, Sherborn, and William A. Conlan, Attleboro, both of Mass., assignors to Shipley Company, Inc., Newton, Mass.

Continuation-in-part of Ser. Nos. 224,742, Feb. 9, 1972, abandoned, and Ser. No. 374,093, June 27, 1973,. This application Nov. 14, 1973, Ser. No. 415,526

Int. Cl. C23c *3/00*

U.S. Cl. 106—1 **68 Claims**

1. A catalyst composition for catalyzing a substrate prior to electroless metal deposition thereon, said catalyst composition comprising the product resulting from the admixture of an acid soluble salt of a catalytic metal selected from the group consisting of silver, gold and the platinum family metals, a solution soluble stannous salt in molar excess of the catalytic metal salt, a hydrohalide acid sufficient to provide a pH less than 1 and urea in an amount such that the molar ratio of the urea to the hydrohalide acid exceeds 1 to 10.

3,874,883

CORROSION INHIBITING PIGMENT AND METHOD OF MAKING SAME

Dennis R. Robitaille, Detroit; Mark S. Vukasovich, and Henry F. Barry, both of Ann Arbor, all of Mich., assignors to American Metal Climax, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 269,508, July 6, 1972, abandoned. This application June 18, 1973, Ser. No. 370,825

Int. Cl. C09C *1/02, 1/04*

U.S. Cl. 106—14 **10 Claims**

1. A method for making an extended corrosion inhibiting pigment which comprises the steps of forming a slurry by dispersing a particulated metal carbonate carrier selected from the group consisting of zinc carbonate, calcium carbonate, strontium carbonate, barium carbonate and mixtures thereof in an aqueous medium, dispersing particulated molybdenum oxide in said slurry in a manner to effect a progressive dissolution thereof to produce solution soluble molybdate ions and a progressive dissolution of the surfaces of the metal carbonate carrier particles to produce solution soluble corresponding metal ions, said metal carbonate carrier present in an amount stoichiometrically in excess of the soluble molybdate ions present to provide residual unreacted cores of solid particulated carrier and to provide an acidic aqueous reaction medium having a pH less than about 6, reacting said molybdate ions and said metal ions to produce solution insoluble metal molybdate compounds as an adherent coating on the surfaces of said particulated carrier, continuing the reaction until the desired quantity of said coating has been deposited on the unreacted cores of said particulated carrier, separating the coated said carrier from said solution, and thereafter drying the coated said carrier for a period of time sufficient to remove substantially all of the entrained moisture therein.

3,874,884

COATING COMPOSITIONS

John Forgie McKellar, and Geoffrey Greenwood Warburton, both of Manchester, England, assignors to Lamson Industries Limited, London, England

Filed Oct. 27, 1972, Ser. No. 301,518

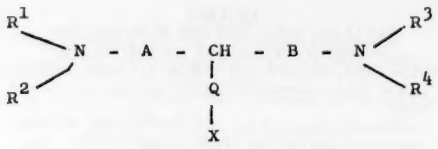
Claims priority, application United Kingdom, Oct. 27, 1971, 49829/71

Int. Cl. C09k *3/00*; C09d *11/00*; B41l *7/00, 9/00*

U.S. Cl. 106—14.5 **12 Claims**

1. A stabilized coating composition suitable for use in the manufacture of a clean-to-handle carbon paper, said composition containing:

a. a colour former of the formula



wherein A and B each independently represents an optionally substituted 1,4-arylene residue; each of R^1, R^2, R^3 and R^4 independently represents hydrogen or an optionally substituted alkyl, aralkyl, cycloalkyl or aryl radical or forms part of a divalent organic chain which together with the attached nitrogen atom constitutes a heterocyclic ring; Q represents —O— or —NR— in which R denotes hydrogen, hydroxyl, alkoxy or an optionally substituted amino, alkyl, aralkyl or cycloalkyl radical and X represents hydrogen or an optionally substituted hydrocarbon radical which may contain one or more hetero atoms, or R and X together with the attached nitrogen atom form an optionally substituted heterocyclic ring, and,

b. an aliphatic amine or a guanidine as a stabilizer, whereby the stability of the coating composition, and coated papers made therefrom, to discolouration under the influence of light is improved.

3,874,885

METHOD OF MAKING FOUNDRY MOULDS AND CORES

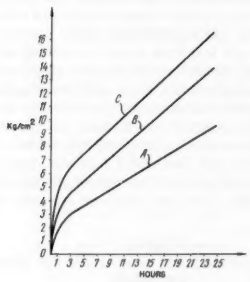
Abram Moiseevich Lyass, Sharikopodshipnikovskaya ulitsa, 2, kv. 146; Pavel Afanasievich Borsuk, Nizhne-Pervomaiskaya ulitsa, 59, kv. 10; Zokhrab Gamid Ogly Usubov, B. Cherkizovskaya ulitsa, kvartal 8-11, korpus 21, kv. 106, and Viktor Georgievich Kuzentsov, 5 Kozhukhovskaya ulitsa, 10, kv. 36, all of Moscow, U.S.S.R.

Filed Apr. 28, 1972, Ser. No. 248,380

Claims priority, application U.S.S.R., Feb. 11, 1971, 1615586

Int. Cl. B28b *7/34*

U.S. Cl. 106—38.35 **6 Claims**



1. A process of making foundry molds and cores from a fluid self-hardening sand or sand mixture with controllable properties comprising the steps of preparing (1) a mixture consisting essentially of 100 parts by weight of molding sand, from 8 to 15 parts by weight of hydraulic cement as a binder, (2) a mixture of from 0.25 to 1.5 parts by weight of an alkali-metal aluminate and from 0.5 to 2.0 parts by weight of an alkali-metal carbonate as the hardening accelerator, from 0.05 to 0.2 parts by weight of a surface-active material with a foaming action; and water; mixing (1) and (2) to form a fluid mass; forming the foundry mold and cores from said mass and hardening said molds and cores in air.

3,874,886

FIBER TORATION; METHOD, EQUIPMENT AND PRODUCT

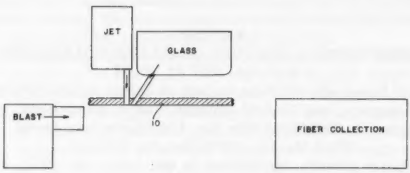
Marcel Levecque, Saint-Gratien, and Jean A. Battigelli, Rantigny, both of France, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France

Filed Apr. 24, 1973, Ser. No. 353,983

Claims priority, application France, Mar. 30, 1973, 73.11525

Int. Cl. C03b *37/04*

U.S. Cl. 106—50 **68 Claims**



1. A method of converting heat softenable material to fibers comprising the steps of generating a gaseous blast and a gaseous jet, said gaseous blast being of substantially larger cross section than said gaseous jet, said gaseous jet being of sufficient kinetic energy and positioned so as to penetrate into said gaseous blast, whereby a zone of interaction is established proximate to the path of penetration of said gaseous jet into said gaseous blast, and introducing heat softened material into said zone of interaction.

3,874,887

ACID-RESISTING MATERIAL

Vsevolod Yakolevich Dalmatov, Kuskovskaya ul., 3, kv. 20; Inna Pavlovna Kim, S. Kovalevskoi ul., 10 korp. 3. kv 214, both of Moscow; Tamara Georgievna Voronkova, Polovaya ul., 9, Skhodnya, and Nikolai Alexeevich Moschansky, Bronitsky per., 3 kv. 11, Moscow, all of U.S.S.R.

Continuation-in-part of Ser. No. 89,436, Nov. 13, 1970, abandoned. This application Oct. 24, 1972, Ser. No. 300,309

Int. Cl. C04b *15/12*, *13/26*

U.S. Cl. 106—84 **8 Claims**

1. An acid-resisting material obtained as a result of solidication of a mixture consisting essentially of an aqueous solution of a water-soluble silicate of sodium or potassium, an inert acid-resisting filler, a solid hardening initiator selected from the group consisting of sodium fluorosilicate and potassium fluorosilicate, and an organic additive selected from the group consisting of furfurol, furfurol-acetone monomer, furfuryl alcohol, and mixtures thereof, said additive being present in an amount of from 0.2 to 5 percent of the total weight of said material.

3,874,888

ROADSTONE

Arthur Wilson, Stourbridge, England, assignor to Albright & Wilson Limited, Warwickshire, England

Continuation of Ser. No. 93,456, Nov. 27, 1970, abandoned. This application Apr. 17, 1973, Ser. No. 351,868

Claims priority, application United Kingdom, Nov. 28, 1969, 58319/69; Apr. 20, 1970, 18798/70

Int. Cl. C08h *17/04*

U.S. Cl. 106—288 B **10 Claims**

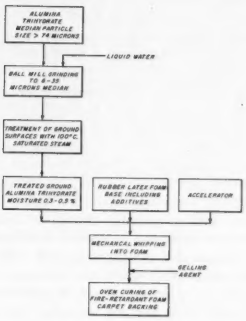
1. An improved composition for surfacing roads consisting essentially of roadstone granules and a paving binder selected from the group consisting of bitumen, resin binders, and cement, the improvement comprising utilizing as said roadstone granules, non-fused granules having a mean dimension of from one-sixteenth inch to one-half inch and consisting essentially of particles of a mineral having the spinel crystal structure of

a particle size of 1 mm to 400 mesh British Sieve Series, said particles being sintered together to form said granules.

3,874,889
FIRE RETARDANT COMPOSITION

Gerard A. Geppert, Belleville, and Robert Dale Woosley, Collinsville, both of Ill., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed June 13, 1973, Ser. No. 369,436
Int. Cl. C09c *1/40*
U.S. Cl. 106—288 B **7 Claims**


ALUMINA TRIHYDRATE MEDIAN PARTICLE SIZE > 74 MICRONS
LIQUID WATER
BALL MILL GRINDING TO 6–35 MICRONS MEDIAN
TREATMENT OF GROUND SURFACES WITH 100°C. SATURATED STEAM
TREATED GROUND ALUMINA TRIHYDRATE MOISTURE 0.3–0.5 %
RUBBER LATEX FOAM BASE INCLUDING ADDITIVES
ACCELERATOR
MECHANICAL WHIPPING INTO FOAM
GELLING AGENT
OVEN CURING OF FIRE-RETARDANT FOAM CARPET BACKING

1. A process for rendering coarse alpha alumina trihydrate particles compatible with foamable latices to produce fire-retardant products comprising

a. grinding the coarse particles to a median particle size of about 6–35 microns with less than about 5 percent of said particles over 74 microns; and

b. contacting the surfaces of the ground particles with liquid water at a temperature of about 20°C to about 100°C or steam at about 100°C to provide a moisture content of at least about 0.25 but less than 1 percent by total weight of the hydrate to provide a treated yet freely flowing comminuted alumina hydrate yet prevent collapse of a fire-retardant foam latex made using said trihydrate.

3,874,890
NACREOUS PIGMENTS AND PROCESS FOR THE PRODUCTION THEREOF

Horst Bernhard, and Reiner Esselborn, both of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Filed Aug. 21, 1973, Ser. No. 390,252
Claims priority, application Germany, Sept. 9, 1972, 2244298
Int. Cl. C09c *1/00*
U.S. Cl. 106—291 **13 Claims**

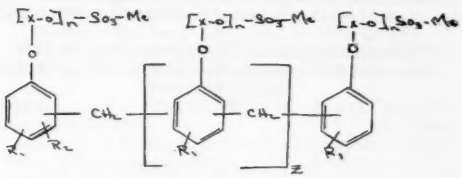
1. A process for the production of golden nacreous pigments by coating mica flakes with a layer of Fe_2O_3– containing TiO_2, ZrO_2, or mixtures thereof, which comprises the steps of precipitating iron hydroxide solution onto mica flakes coated with TiO_2, ZrO_2, or a mixture thereof, by adding an aqueous Fe (II) salt solution to a suspension of the mica flakes at a constant temperature and a constant pH above 5 and a rate of addition not exceeding the rate at which the salt is converted to hydroxide and adsorbed on the mica flakes, and thereafter oxidizing the deposited iron hydroxide to Fe_2O_3.

3,874,891
DISPERSING AGENTS FOR THE FINE DISTRIBUTION AND STABILISATION OF DYES

Max Grobmann; Karl-Hermann List, both of Frankfurt am Main, and Heinz Uhrig, Steinbach, Taunus, all of Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt, Germany

Filed Feb. 22, 1973, Ser. No. 334,780
Claims priority, application Switzerland, Feb. 25, 1972, 2729/72
Int. Cl. C08h *17/00;* **C09c** *3/02*
U.S. Cl. 106—308 S **2 Claims**

1. A dyestuff and pigment dispersion containing, as the dispersing agent, a sulfuric acid semi-ester of the general formula

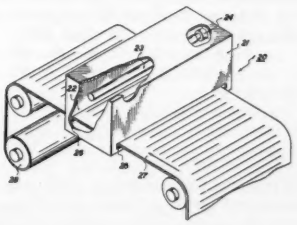


in which X stands for an ethylene or propylene group, R_1 for a saturated alkyl group having 4 to 14 carbon atoms, R_2 for a hydrogen atom or a saturated alkyl group having 4 to 14 carbon atoms, *n* for an integer of 2 to 25, preferably 3 to 15, Z for zero or an integer of 1 to 8 and Me for a hydrogen atom, an alkali metal atom, an equivalent of an alkaline earth metal atom, an ammonium ion or the radical of an organic base.

3,874,892
ELECTROSTATOGRAPHIC FUSING PROCESS EMPLOYING REPLACEABLE LINER

John A. McInally, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 104,342, Jan. 6, 1971,. This application Nov. 24, 1972, Ser. No. 309,385
Int. Cl. C03g *13/70, 15/70*
U.S. Cl. 117—6 **2 Claims**



1. An imaging process comprising:

a. providing a fuser housing including outer chamber walls the inner surface of which are lined with a layered, strippable, highly reflective material selected from the group consisting of glass fibers, silicon dioxide, magnesium oxide, titanium dioxide, calcium oxide, zinc oxide, calcium carbonate, magnesium carbonate, barium carbonate, lead carbonate, and quartz wool, and a high intensity

radiation source supported within the cavity of said housing;

b. developing a toner image on the surface of an image support member;

c. introducing said image support member into the cavity of said housing and exposing said toner image to said high intensity radiation source to fuse said image; and

d. repeating steps (b) and (c) until the reflective material becomes contaminated and its reflectance becomes substantially reduced, at which time said contaminated layered, strippable reflective material is peeled from an underlying layer to expose a fresh uncontaminated layer of the reflective material thereby maintaining cavity efficiency.

3,874,893

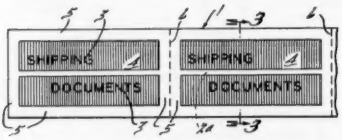
SHIPPING DOCUMENTS DEVICE AND METHOD

Phil Cherrin, Huntington Woods, Mich., assignor to Abe Cherrin and Lem Cherrin, both of Southfield, Mich., a part interest to each

Continuation-in-part of Ser. No. 99,213, Dec. 17, 1970, abandoned. This application Oct. 3, 1972, Ser. No. 294,627

Int. Cl. D21h *1/10*

U.S. Cl. 117—15 **13 Claims**



1. An article for attaching documents and the like to the outside of containers, and for other uses, comprising: a sheet of ...terial; a first coating disposed on substantially the entirety of one side of said sheet, said first coating consisting of a normally sticky adhesive material; a second coating disposed on said side of said sheet in a first area; and a third coating disposed on said side of said sheet in a second area, said first and second areas being spaced inwardly from the peripheral edges of said sheet, said second and third coatings each consisting of material which substantially removes the stickiness of said first coating, said second coating being of a predetermined coloring material, said third coating being of a contrasting coloring material.

3,874,894

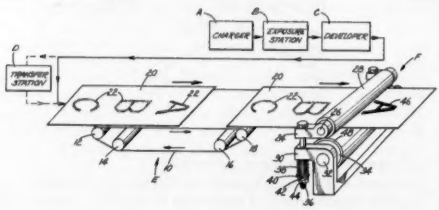
METHOD AND APPARATUS FOR AMBIENT TEMPERATURE PRESSURE FIXING OF TONERS

Peder M. Pedersen, Elmhurst, Ill., assignor to Addressograph-Multigraph Corporation, Cleveland, Ohio

Filed Oct. 27, 1972, Ser. No. 301,463

Int. Cl. G03g *13/20, 15/20*

U.S. Cl. 117—17.5 **4 Claims**



1. Apparatus for providing a permanent image on a sheet wherein the image is a fixed image of toner powder, comprising means for creating an electrostatic latent image; means for depositing toner powder upon said sheet to form a toner powder image pattern in conformity with said latent image; and means for fixing the toner powder image to said sheet, said last mentioned means including two unheated pressure rolls at least one of which has a smooth, deformable surface which is susceptible to failure due to aberrant deformation, said deformation exceeding the elastic limit for the surface but being within the plastic limit for the surface, said deformation being caused by localized pressure contact with a material substantially thicker than the combined thickness of said sheet and said toner powder; means for applying pressure to said rolls sufficient to fix said toner powder image and to produce aberrant deformation of said deformable surface; means for feeding individual sheets to said pressure rolls at spaced intervals; a working surface on said at least one roll, consisting essentially of nylon-6 and a working surface on the other roll which is at least as hard as said nylon-6, said nylon-6 working surface having a thickness of at least about 0.25 inches, sufficient to permit it to recover from aberrant deformation at ambient temperature, while remaining in service.

4. The method of providing a permanent image on a sheet wherein the image is a fixed image of toner powder comprising the steps of creating an electrostatic latent image; depositing toner powder upon said sheet to form a toner powder image pattern in conformity with said latent image; and fixing the toner powder image to said sheet, said last mentioned step including providing two unheated pressure rolls, at least one having a working surface consisting essentially of nylon-6, and the other having a working surface which is at least as hard as said nylon-6; and advancing sheets, bearing toner powder images between said rolls at spaced intervals, thereby fixing said toner images and maintaining said rolls in direct rolling contact with each other when out of contact with successive advancing sheets, whereby aberrant deformations which exceed the elastic limit for the material forming the working surface of the rolls but are within the plastic limit for said material developed during the advancement of sheets between said rolls, are corrected when the rolls are in direct rolling contact with each other.

3,874,895

RECORDING SHEET

Takao Hayashi, and Hajime Kato, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 30, 1972, Ser. No. 301,931

Claims priority, application Japan, Nov. 1, 1971, 46-86950

Int. Cl. B41M *5/00*

U.S. Cl. 117—36.8 **14 Claims**

1. A recording sheet comprising a support having thereon a color developer layer capable of reacting with a color former to form a color image, which color developer layer comprises (1) an acidic polymer, (2) an organic aromatic carboxylic acid having 1 to 3 carboxylic groups and having 1 to 3 hydroxyl groups or a metal salt thereof, and (3) a binder.

3,874,896

REVERSIBLE DEVELOPER FOR ELECTROSTATIC LATENT IMAGING METHOD

Hazime Machida; Akira Tsurugi, and Zenjiro Okuno, all of Tokyo, Japan, assignors to Kabushiki Kaisha Ricoh, Tokyo, Japan

Continuation-in-part of Ser. No. 176,727, Aug. 31, 1971, abandoned, which is a continuation of Ser. No. 838,640, July 2, 1969, abandoned. This application Oct. 22, 1971, Ser. No. 191,894

Claims priority, application Japan, July 11, 1968, 43-48108The portion of the term of this patent subsequent to Jan. 12, 1988, has been disclaimed.

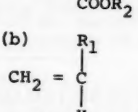
Int. Cl. B05c *1/16;* **B44d** *1/02;* **G03g** *9/04*

U.S. Cl. 117—37 LE **7 Claims**

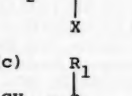
1. In a method for developing electrostatic latent images, in which a copy material bearing the latent image is immersed in a liquid developer, the improvement which comprises employing a liquid developer comprising pigment particles having a

charge-modifying copolymer coating and dispersed in a hydrocarbon carrier liquid having a relative resistance of more than $10^9\Omega$ cm. and a dielectric constant of less than 3, said pigment being selected from the group consisting of carbon black (C.I. No. 77266), Fast Yellow G (C.I. No. 13135), Benzidine Yellow TR (C.I. No. 21090), Cyanine Blue BM (C.I. No. 74160), Fast Red 2B (C.I. No. 37115), Pigment Scarlet TR (C.I. No. 16105), Brilliant Carmine FB (C.I. No. 16105), Brilliant Carmine 6B (C.I. No. 24830), Aizen Spilon Yellow (C.I. No. 41000), Aizen Spilon Red (C.I. No. 22310), Aizen Spilon Blue (C.I. No. 22610), Aizen Victoria Blue (C.I. No. 44045), Spirit Black (C.I. No. 50415), Vali Fast Yellow (C.I. No. 11680), Vali Fast Red (C.I. No. 12120), Vali Fast Brown (C.I. No. 20195), Vali Fast Blue (C.I. No. 51175), Vali Fast Black (C.I. No. 51215), Oil Blue BO (C.I. No. 77450), Oil Green (C.I. No. 77601) and Oil Black (C.I. No. 77011), in which said copolymer coating reverses the charge of the coated pigment disperesed in said carrier liquid as compared with pigment free of said copolymer coating and dispersed in said carrier liquid, said copolymer being selected from the group consisting of (I) a copolymer of monomer (a) and monomer (b) in which the mol ratio of monomer (b) to monomer (a) is in the range of about 0.1–0.7:1, to give positively charged coated pigment particles at room temperature, and (II) a copolymer of monomer (a) and monomer (c) in which the mol ratio of monomer (c) to monomer (a) is in the range of about 0.01–0.5:1, to give negatively charged coated pigment particles at room temperature,

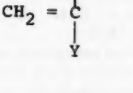
monomer (a)



monomer (b)



monomer (c)

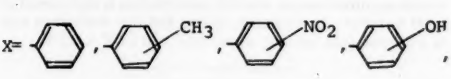


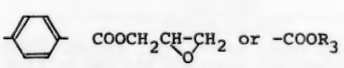
wherein:

$R_1 = -CH_3$ or $-H$

$R_2 = -C_nH_{2n+1}$ $(1 \leq n \leq 20)$

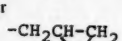
X=





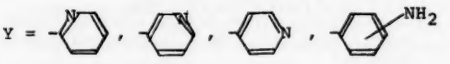
wherein:

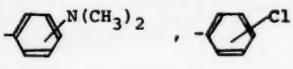
$R_3 = -C_mH_{2m}OH$ or

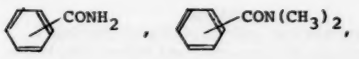


$(1 \leq m \leq 4)$

Y =







$-CONH_2$, $-COOR_4$ or $-CON(C_mH_{2m+1})_2$

wherein:

$R_4 = -C_mH_{2m}N(C_{m'}H_{2m'+1})_2$

$(1 \leq m \leq 4), (1 \leq m' \leq 4)$,

and raising the temperature of the liquid developer to from 20° to 40°C above room temperature so that the pigment particles then have a charge of a polarity opposite to the polarity of the charge they possess at room temperature.

3,874,897

ACTIVATOR SOLUTIONS, THEIR PREPARATION AND USE IN ELECTROLESS PLATING OF SURFACES

Earl Joseph Fadgen, Jr., Clinton, and Edward Basil Saubestre, Hamden, both of Conn., assignors to Enthone Incorporated, New Haven, Conn.

Division of Ser. No. 171,739, Aug. 13, 1971, Pat. No. 3,767,583, which is a continuation-in-part of Ser. No. 84,500, Oct. 27, 1970, abandoned. This application June 25, 1973, Ser. No. 373,073

Int. Cl. B44D *5/00*

U.S. Cl. 117—47 R **31 Claims**

1. A process for the electroless metal plating of a surface which comprises contacting an object non-catalytic surface intended to be electrolessly metal plated with a substantially colloidal metal particle-free liquid catalyst solution containing a soluble Lewis base-modified nobel metal-tin halide complex and a hydro-halide acid until the surface is rendered catalytic, the nobel metal of the complex being a nobel metal catalytic to the chemical reduction deposition of the metal desired to be plated on said surface, the Lewis base being selected from the group consisting of 1-4C alkanols, compounds of the formula

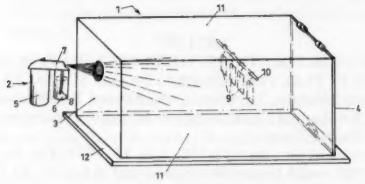
wherein R and R_1 are each $-H$ or $-CH_3$, mixtures of a 1-4C alkanol and a compound of the formula RCOOM wherein R is monocyclic carbocyclic aryl, $-H$ or 1-4C alkyl and M is a compatible alkali metal cation, mixtures of a compound of the formula RCOOM wherein R and M have the meaning aforesaid and a compound of the formula

wherein R and R_1 have the meaning aforesaid, and mixtures of the 1-4C alkanols, the catalyst solution being prepared by a process comprising mixing together a soluble salt of the noble metal, the selected Lewis base, a soluble stannous halide and a hydro-halide acid, at a temperature in the range of about 90°F. to about 150°F., and holding the thus-obtained reaction mixture for a period of at least 2 days and sufficient to obtain a catalytically effective solution containing the soluble Lewis base-modified noble metal-tin halide complex, the Lewis base being present in amount sufficient to obtain the soluble complex, the stannous halide being present in excess of the amount required to reduce the soluble noble metal salt to zero valent noble metal, the Lewis base being present in the reaction mixture at the outset of a redox reaction between the stannous halide and the noble metal salt to prevent precipitation of zero valent noble metal and formation of a colloidal system, and electrolessly plating the metal on the thus-obtained catalytic surface by contacting the catalytic surface with a chemical reduction metal plating bath.

3,874,898
DRYING PROCESS AND RESULTANT PRODUCT

Alan Don McInnes, Wollstonecraft, and Robert John Bolton, West Pymble, both of New South Wales, Australia, assignors to A. C. Hatrick Chemicals Pty. Limited, Botany, New South Wales, Australia

Filed June 19, 1972, Ser. No. 264,191
Int. Cl. B44d *1/44*
U.S. Cl. 117—62 11 Claims



1. A process for rapidly forming a dried coating upon a suitable substrate comprising (1) coating a vehicle consisting essentially of at least one polyisocyanate prepolymer and at least one organic solvent upon said substrate and (2) subjecting said vehicle to treatment with an agent consisting essentially of ammonia, monofunctional amine or polyfunctional amine, said agent being in vapor form.

3,874,899
PROCESS FOR THE PREPARATION OF POROUS MEMBRANES OR COMPOSITE BARRIERS FOR GASEOUS DIFFUSION INSTALLATIONS

Giorgio Szabo Miszenti, and Carlo Alberto Nannetti, both of Novara, Italy, assignors to Montecatini Edison S.p.A., Milan, Italy

Filed Aug. 18, 1972, Ser. No. 281,801
Claims priority, application Italy, Aug. 24, 1971, 27802/71
Int. Cl. B05c *9/08*
U.S. Cl. 117—66 12 Claims

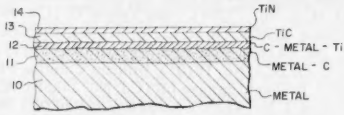
1. A process for the preparation of porous barriers or membranes of the composite type, consisting essentially throughout of sintered porous alumina, said process comprising:
a. preparing a support of sintered porous alumina;
b. depositing on said support a microporous layer by filtering through the porous walls of said support under a suitable pressure difference an aqueous suspension containing submicronic particles of a material selected from the group consisting of alumina and aluminum hydrates and at least one hydrophillic ether or cellulose;
c. eliminating the excess suspension from the upstream side of the support and letting the resulting layer dry;
d. calcining the resulting manufactured article in air until the combustible substances are eliminated;
e. sintering the article in air at temperatures exceeding 900°C, and subjecting the microporous layer, after the calcination and before the final sintering, to a cold compacting step.

3,874,900
ARTICLE COATED WITH TITANIUM CARBIDE AND TITANIUM NITRIDE

Robert C. Post, Dallas; Allen W. McCullough, Ferris, and James H. McClure, Dallas, all of Tex., assignors to Materials Technology Corporation, Dallas, Tex.

Filed Aug. 13, 1973, Ser. No. 387,665
Int. Cl. C23c *11/08*
U.S. Cl. 117—69 4 Claims

1. An article of manufacture comprising:
a. a substrate, and
b. a composite coating on at least one surface of said substrate, said composite coating including a layer of titanium carbide and a layer of titanium nitride overlying and adjacent said layer of titanium carbide.



3,874,901
COATING SYSTEM FOR SUPERALLOYS

John R. Rairden, III, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 23, 1973, Ser. No. 353,660
Int. Cl. B44d *1/14*
U.S. Cl. 117—71 M 9 Claims

1. A method of improving the high temperature oxidation and corrosion resistance of a nickel-base or a cobalt-base superalloy body comprising the steps of:
a. coating the superalloy body by physical vapor deposition with a composition consisting essentially of chromium, aluminum, a member selected from the group consisting of yttrium and the rare earth elements, and at least one element selected from the group consisting of iron, cobalt and nickel, and
b. subjecting the coated body to an overcoat of aluminum deposited by physical vapor deposition, and
c. heat treating the duplex coating to cause the interdiffusion of aluminum with the first coating to increase the oxidation and corrosion resistance of the coating.

3,874,902
METHOD OF NEUTRALIZING SURFACE COLOR CAUSED BY ANODIZING ALUMINUM ALLOYS

Joseph Moore Andrus, Park Ridge, Ill., assignor to Stauffer Chemical Company, Westport, Conn.

Filed May 28, 1974, Ser. No. 474,113
Int. Cl. B44d *1/16*; C23f *5/04, 17/00*
U.S. Cl. 117—71 M 6 Claims

1. A method of neutralizing an undesired cast appearing in an anodized surface of an aluminum alloy, by sealing said anodized surface with an aqueous solution containing a monoazo metallic dye of a color and in a concentration sufficient to neutralize said undesired cast without imparting the dye color to said anodized surface wherein said solution is maintained at a pH necessary for optimum sealing and dye absorption and at a temperature between about 180° and 210° ± 0.5°F.

3,874,903
EPOXY RESINS

Thaddaus Wirth, Mainz; Joachim Peter, Weilburg; Walter Sprenger, Dieburg, and Jurgen Ritz, Nierstein, all of Germany, assignors to Reichhold-Albert-Chemie-Aktiengesellschaft, Hamburg, Germany

Filed Mar. 29, 1972, Ser. No. 239,344
Claims priority, application Germany, Jan. 31, 1972, 2204413
Int. Cl. C07d *103/02*; B44d *1/14*
U.S. Cl. 117—72 9 Claims

1. An article of manufacture comprising:
A. a substrate selected from the group consisting of metals, wood, ceramic, glass, cement, concrete, and synthetic resins, and
B. a first coating which is a primer adhering to the substrate, wherein the first coating consists essentially of a component selected from the group consisting of
a. an epoxy resin modified by acetoacetic ester groups,

b. an epoxy resin as under (a) in combination with a suitable hardening agent,
c. an epoxy resin as under (a) in combination with at least one additive selected from the group consisting of fillers, pigments, dyes, lubricants, suspending agents and solvents,
d. an epoxy resin as under (a) in combination with at least one other resin selected from the group consisting of epoxy, alkyd, polyester, phenolic and amino resins, polyurethanes, polyaminoimide resins, polymerisation resins selected from the group consisting of (d1) hydrocarbon resins, (d2) acrylic resins,
e. a combination of at least two of (a) to (d), wherein the epoxy resin (a) is present in an amount of at least 20 per cent by weight, referred to the total solids content, and

C. a second coating adhering to the first coating wherein the second coating is a polymer of a fluorine-containing vinyl monomer.

3,874,904

METHOD OF POLYURETHANE COATING USING A ONE-COMPONENT POLYURETHANE

Leon Orsini; Roger Laurent, and Denis Dessevre, all of Grenoble, France, assignors to P.B.U. (Progil-Bayer-Ugine), Pont-de-Claix, France

Division of Ser. No. 102,559, Dec. 29, 1970, abandoned, which is a continuation-in-part of Ser. No. 727,079, May 6, 1968, abandoned. This application Oct. 6, 1972, Ser. No. 295,556

Claims priority, application France, May 26, 1967, 67.108676

Int. Cl. B32b *27/40*

U.S. Cl. 117—72 **2 Claims**

1. A method of coating a surface with a polyurethane coating which comprises applying onto said surface a prime coat of a solution of polyurethane in a volatile organic solvent, said solution containing 30–80 percent of dry extract, said solution being applied at the rate of 50 – 400 g/m²; after a period of at least 15 minutes applying thereon a top coating of 3–15 mm thickness of a non-component polyurethane having free isocyanate groups and having a ratio of NCO/OH in the range of 2.5 – 10 and including 2 – 40 parts by weight of dry polyurethane of pulverulent filler having a grain size of 0.05–3mm diameter; thereafter allowing said one-component polyurethane to cure in the presence of moisture.

3,874,905

WAX COATED PAPER OF IMPROVED WATER RESISTANCE

Evord F. Knights, Anaheim, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed June 28, 1973, Ser. No. 374,550

Int. Cl. B65d *5/56;* **B32b** *29/06*

U.S. Cl. 117—76 P **14 Claims**

8. A method for waterproofing a paper surface which comprises,

1. applying to said surface a light coating consisting essentially of a styrene-butadiene latex, said coating being controlled so as to provide between about 0.2 and 4 pounds of latex solids per 1,000 square feet of paper surface and to increase the water resistance of said paper surface by only about 1–25 percent;
2. drying and heat-curing the latex-coated surface;
3. applying over the cured latex-coated surface a relatively heavier coating of molten paraffin wax;; and
4. cooling the wax-coated surface.

3,874,906

PROCESS FOR APPLYING POLYESTER-ACRYLATE CONTAINING IONIZING IRRADIATION CURABLE COATINGS

Paul J. Prucnal, Monroeville, and Charles B. Friedlander, Allison Park, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sept. 22, 1972, Ser. No. 291,475

Int. Cl. B44d *1/50;* **C08f** *3/64*

U.S. Cl. 117—93.31 **9 Claims**

1. A method of coating a substrate comprising applying to said substrate a low odor, low volatility, curable polyester-acrylate containing composition and subjecting the composition to actinic light to cure; said polyester-containing composition comprising

A. a polyester-acrylate and
B. from about 2 to about 60 percent by weight based on the weight of polyester-acrylate containing composition of N-vinyl pyrrolidone.

3,874,907

MICROCAPSULES FOR USE IN ARTIFICIAL KIDNEY MACHINES

Roger Gardon, and Jean-Pierre Quentin, both of Lyon, France, assignors to Rhone Poulenc S.A., Paris, France

Filed Feb. 13, 1973, Ser. No. 332,218

Claims priority, application France, Feb. 16, 1972, 72.05187

Int. Cl. B32b *27/08*

U.S. Cl. 117—100 C **18 Claims**

1. Substantially spherical microcapsules of diameter between about 10μ and 5 mm, consisting essentially of a cross-linked polymer containing sulphonic acid groups and possessing a theoretical exchange capacity greater than about 0.5 meq/g of dry polymer having a skin coating of a coating polymer containing quaternary ammonium groups bonded by at least one covalent bond to the chain of said coating polymer, the polymer possessing a permeation selectivity greater than about 65 percent and a water absorption of between about 2 and 50 percent, the thickness of the skin being about 0.1 to 20 percent of the radius of the microcapsule.

3,874,908

COMPOSITION AND METHOD FOR MAINTAINING A CONSTANT CONCENTRATION OF AGENTS AND AMOUNT OF SOLVENT IN A WOOD TREATING PROCESS

Harold G. Liddell, Angleton, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed July 31, 1972, Ser. No. 276,682

Int. Cl. B27k *3/08, 3/40*

U.S. Cl. 117—102 R **6 Claims**

5. The process of claim **4** wherein the solvent is methylene chloride.

3,874,909

METHOD FOR FORMING A CARBIDE LAYER ON THE SURFACE OF AN IRON OR FERROUS ALLOY ARTICLE

Tohru Arai; Mikio Obayashi, and Junji Endo, all of Midoriku, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Nagoyashi, Aichiken, Japan

Filed Dec. 19, 1972, Ser. No. 316,502

Claims priority, application Japan, Dec. 20, 1972, 46-102629; Dec. 20, 1971, 46-102630; Dec. 20, 1971, 46-102631

Int. Cl. C23c

U.S. Cl. 117—106 C **11 Claims**

1. A method for forming a carbide layer on the surface of iron or a ferrous alloy article in a powdery treating material, said article containing at least 0.02 percent of carbon, comprising the steps of preparing the powdery treating material consisting essentially of 0.5 to 80 percent by weight of one member selected from the group consisting of potassium

tetrafluoroborate, sodium tetrafluoroborate, ammonium tetrafluoroborate and mixtures thereof and 20 to 99.5 percent by weight of one member selected from the group consisting of metallic Ti, Zr, Hf, V, Nb, Ta, Mo, W, ferrous alloys thereof, and mixtures thereof packing the article in said powdery

(×400)

treating material, heating said article within said powdery treating material at a temperature between 600° and 1200°C for 1 to 30 hours; taking said article out of said powdery treating material, and thereby forming the carbide layer of Ti, Zr, Hf, V, Nb, Ta, Mo, W of mixtures thereof on the surface of said article.

3,874,910

SPACER STRIP AND METHOD FOR MAKING SUCH SPACER STRIPS

Dieter Altmann, Gruendau-Lieblos, and Eberhard Haupt, Gruendau-Rothenbergen, both of Germany, assignors to Wilhelm Haupt, Rothenbergen, Germany

Filed Aug. 20, 1973, Ser. No. 389,566

Claims priority, application Germany, Aug. 22, 1972, 2241201; Sept. 18, 1972, 2245742

Int. Cl. B29c *17/14*

U.S. Cl. 264—160 **7 Claims**

1. A method of making spacer strips, especially for electrically heated mats, which strips receive and hold elongated elements in proper relationship relative to each other, comprising deforming thermoplastic sheet material to produce a plurality of elastically deformable grooves in said sheet material wherein said grooves extend substantially in parallel to each other and at given spacings from each other in said sheet material, and cutting the grooved sheet material into a plurality of independent strips so that the cuts extend substantially across the longitudinal extension of the grooves.

3,874,911

PROCESS FOR THE MANUFACTURE OF PHOSPHORUS-CONTAINING CONDENSATION PRODUCTS, THE PRODUCTS AND THEIR USE AS FLAMEPROOFING AGENTS

Hermann Nachbur, Dornach, and Arthur Maeder, Therwil, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Aug. 31, 1972, Ser. No. 285,170

Claims priority, application Switzerland, Jan. 14, 1972, 520/72

Int. Cl. C09d *1/00*

U.S. Cl. 117—136 **17 Claims**

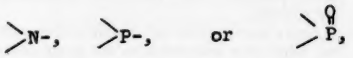
1. A process for flameproofing mixed polyester-cellulose fiber material, comprising the sequential steps of treating the material with an aqueous preparation which consists essentially of (1) a water-soluble condensation product obtained by condensing a tetrakis-(hydroxymethyl)-phosphonium compound at 40° to 120° C with 0.02 to 1.0 molar equivalent of a compound of the formula:

$$R—CONH_2$$

wherein R denotes alkoxy with 1 to 4 carbon atoms, hydroxyalkoxy with 2 to 4 carbon atoms, aminocarbonyl or a radical of the formula

$$(H_2N — CO — CH_2CH_2)_2 — Z — CH_2CH_2 —$$

wherein Z represents



and (2) a polyfunctional aminoplast precondensate, and curing the treated material.

3,874,912

RENDERING FIBROUS MATERIAL FLAME RETARDANT

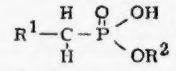
Ronald Swidler; William A. Sanderson, both of Palo Alto, and William A. Mueller, Pasadena, all of Calif., assignors to Cotton Incorporated, New York, N.Y.

Continuation-in-part of Ser. No. 259,350, June 2, 1972, abandoned, which is a continuation of Ser. No. 153,094, June 14, 1971, abandoned, which is a continuation of Ser. No. 862,509, Sept. 30, 1969, abandoned. This application July 2, 1973, Ser. No. 375,439

Int. Cl. C09k *3/28*

U.S. Cl. 117—136 **21 Claims**

1. A process for rendering cellulosic and wool fiber-containing material flame retardant, which process comprises contacting the material with cyanamide and at least one phosphonic acid represented by the structural formula:



wherein R^1 represents a monovalent radical selected from the group consisting of hydrogen and lower alkoxy; and wherein R^2 represents a monovalent radical selected from the group consisting of hydrogen and lower alkyl, to deposit on the material a flame retarding amount of the phosphonic acid with cyanamide.

3,874,913

METHOD FOR MAKING A NONWOVEN FABRIC

Peter Frederick Lofts, 30 Winston Ave., Cross Hills, near Keighley, Yorkshire; John Elves, 45 Priory Gardens, Usk, Monmouthshire, and Peter Brown, 7. Sandringham Close, Clayton, Bradford, Yorkshire BD146EB, all of England

Filed May 11, 1973, Ser. No. 359,399

Claims priority, application Great Britain, May 12, 1972, 22372/72

Int. Cl. C08c *17/16*

U.S. Cl. 177—140 R **17 Claims**

1. A method for making a nonwoven fabric comprising:

a. providing a bonded web of fibers, said bonded web of fibers having substantial wet strength;

b. dispersing zinc stearate particles in water to form an aqueous zinc stearate suspension;

c. treating said bonded web by applying said aqueous suspension thereto; and
d. drying the treated bonded web at a temperature below the melting point of the zinc stearate whereby there is formed a nonwoven fabric having zinc stearate particles attached to a surface thereof.

3,874,914

ADHESIVE COATINGS OF VINYL POLYMERS AND COPOLYMERS AND METHOD OF MAKING SAME

David Travis, Lumberton, N.J., assignor to Sybron Corporation, Rochester, N.Y.

Filed Aug. 18, 1972, Ser. No. 281,789
Int. Cl. B44d *1/02*
U.S. Cl. 117—161 UH **8 Claims**

1. A process for promoting the adhesion of a free-flowing powdered vinyl resin to a substrate comprising producing an anhydrous coating composition consisting essentially of said vinyl resin and at least about 0.5% by weight based upon the weight of the vinyl resin of a polyfunctional aziridine having at least two aziridinyl groups per molecule, said aziridine being dissolved in an organic liquid medium that is nonreactive with the aziridine; and applying said coating composition to the substrate, whereby the polyfunctional aziridine increases the adhesion of the vinyl resin to the substrate.

3,874,915

SILICON NITRIDE ON SILICON OXIDE COATINGS FOR SEMICONDUCTOR DEVICES

Minoru Ono, Kodaira, and Toshimitu Momoi, Tokyo, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 65,383, Aug. 20, 1970, Pat. No. 3,788,913, which is a division of Ser. No. 701,988, Jan. 31, 1968, abandoned. This application July 10, 1973, Ser. No. 377,901
Claims priority, application Japan, Feb. 3, 1967, 42-6608; Feb. 3, 1967, 42-6609
Int. Cl. B01d *1/18;* **H01l** *7/44*
U.S. Cl. 117—212 **9 Claims**

1. A method of making a semiconductor device comprising the steps of:
a. preparing a semiconductor substrate comprising a principal surface having a predetermined portion thereof covered with a first insulating film consisting mainly of silicon oxide,
b. covering at least a portion of the exposed surface of said first film and at least a portion of said principal surface not covered with the first film with a second insulating film consisting mainly of silicon nitride,
c. completely covering said first and second films, except for a portion of said second film directly contacting the surface of said semiconductor substrate at a location spaced from the portion of said surface covered with said first insulating film, with a corrosion resistive mask,
d. exposing the combination thus composed to an etchant to partially etch away the portion of said second insulating film not covered with said corrosion resistive mask, and
e. introducing a conductivity type impurity into said substrate using said first insulating film as a selective mask.

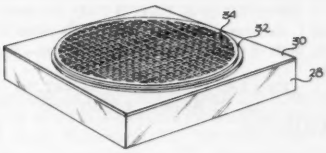
3,874,916

MASK ALIGNMENT SYSTEM FOR ELECTRON BEAM PATTERN GENERATOR

William R. Livesay, Camarillo, and Malcolm E. Wing, Agoura, both of Calif., assignors to Radiant Energy Systems, Inc., Newbury Park, Calif.

Filed June 23, 1972, Ser. No. 265,558
Int. Cl. H05b *33/28;* **B44d** *1/18*
U.S. Cl. 117—211 **14 Claims**

1. A mask blank from which a photomask may be produced for use in integrated circuit fabrication processes, said mask blank comprising:
a transparent, electrically nonconductive substrate for supporting a photomask;
a first layer of electrically conductive metal masking material on one surface of said substrate;
a second layer of electron sensitized material over said first layer; and



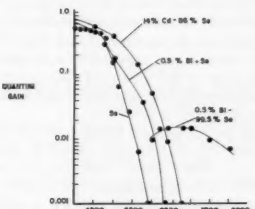
a third layer of electrically conductive metal material over said second layer, said third layer being patterned to form a repetitive, electrically interconnected pattern in the interstices between areas for formation of a matrix of circuit patterns.

3,874,917

METHOD OF FORMING VITREOUS SEMICONDUCTORS BY VAPOR DEPOSITING BISMUTH AND SELENIUM

Charles Wood, Sycamore, Ill.; John C. Schottmiler, Penfield, and Francis W. Ryan, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 79,970, Oct. 12, 1970, abandoned, which is a division of Ser. No. 674,267, Oct. 10, 1967, Pat. No. 3,627,573, which is a continuation-in-part of Ser. No. 550,215, May 16, 1966, abandoned. This application June 18, 1973, Ser. No. 371,096
Int. Cl. H05b *33/28;* **C23c** *11/00*
U.S. Cl. 117—211 **8 Claims**



1. A method for forming a vitreous semiconductor responsive to radiation in the red and infrared region which comprises:
a. simultaneously heating nonstoichiometric amounts of bismuth and selenium under vacuum conditions to form vapors of both components, and
b. simultaneously vapor quenching the bismuth and selenium vapors onto a cold substrate maintained at a temperature below the condensation point of either compo-

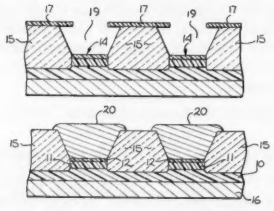
nent, thereby forming a vitreous semiconductor film on said substrate, said method being further defined in that the heating step is carried out in a manner such that the vitreous semiconductor formed contains at least about 0.5 atomic percent bismuth and a stoichiometric excess of selenium.

3,874,918

STRUCTURE AND PROCESS FOR SEMICONDUCTOR DEVICE USING BATCH PROCESSING

Marshall I. Nechtow, Torrance, and Jiri Sandera, Manhattan Beach, both of Calif., assignors to TRW Inc., Los Angeles, Calif.

Filed Feb. 19, 1974, Ser. No. 443,781
Int. Cl. B44d *1/18*; H01l *3/00*
U.S. Cl. 117—212 **14 Claims**



1. A method of fabrication of semiconductor devices which comprises the steps of:
   a. forming a semiconductor junction on one surface of a wafer of semiconductor material;
   b. etching areas of said surface of said wafer whereby a plurality of mesas are formed on said wafer, each of said mesas containing a semiconductor junction;
   c. coating the side of said wafer containing said mesa with glass, the thermal coefficient of expansion of said glass being substantially the same as said wafer;
   d. forming a mask on the surface of said glass whereby the area of said mesas is not covered by said mask;
   e. etching said glass in the areas not covered by said mask whereby substantially conical holes are etched in said glass over said mesas; and
   f. plating metal in said conical holes.

3,874,919

OXIDATION RESISTANT MASK LAYER AND PROCESS FOR PRODUCING RECESSED OXIDE REGION IN A SILICON BODY

Herbert S. Lehman, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 13, 1974, Ser. No. 450,631
Int. Cl. B44d *1/18*; H01l *7/44*
U.S. Cl. 117—212 **4 Claims**

1. An oxidation resistant masking layer for a silicon semiconductor body comprised of
   a first layer of oxygenated silicon nitride material having a refractive index in the range of 1.60 to 1.85 and a thickness greater than 50 Angstroms, said layer contiguous with said body, and
   an overlying second layer of Si_3N_4 bonded to said first layer and having a thickness of at least 100 Angstroms.

2. A process for forming recessed thermal SiO_2 isolation regions in a silicon semiconductor body comprising:
   forming on the surface of the silicon body a blanket layer of oxygenated silicon nitride of a thickness of at least 50 Angstroms,
   depositing an overlying blanket layer of Si_3N_4 on said first layer,
   forming openings in the resultant composite layer that define the desired recessed isolation regions,
   exposing the resultant structure to an oxidizing environment for a time sufficient to form the desired silicon oxide regions.

3,874,920

BORON SILICIDE METHOD FOR MAKING THERMALLY OXIDIZED BORON DOPED POLY-CRYSTALLINE SILICON HAVING MINIMUM RESISTIVITY

Ronald E. Chappelow, Salt Point; Joseph Doulin, Jr., Newburgh; Paul T. Lin, Wappingers Falls, and Homi G. Sarkary, Hopewell Junction, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 28, 1973, Ser. No. 374,426
Int. Cl. B44d *1/14*
U.S. Cl. 117—215 **5 Claims**

1. The method comprising
   providing a substrate suitable for the deposition of polycrystalline silicon
   depositing polycrystalline silicon on said substrate in the presence of boron, the concentration of said boron in the deposited polycrystalline silicon exceeding the limit of solubility of boron in silicon at localized areas within the bulk of said deposited polycrystalline silicon, said concentration being at said limit within said deposited polycrystalline silicon at other than said localized areas, and subsequently
   oxidizing said deposited polycrystalline silicon at a temperature in the range from about 800°C to about 1150°C.

3,874,921

WELDABLE PRIMER COMPOSITIONS AND PROCESSES EMPLOYING SAME

Judson P. Todd, 943 16th E., Seattle, Wash. 98105

Continuation-in-part of Ser. No. 614,003, Feb. 6, 1967, abandoned, which is a continuation-in-part of Ser. No. 479,342, Aug. 12, 1965, abandoned, which is a continuation-in-part of Ser. No. 193,874, May 10, 1962, abandoned. This application June 17, 1969, Ser. No. 834,155. The portion of the term of this patent subsequent to Aug. 29, 1984 has been disclaimed.
Int. Cl. B44d *1/18*; H01b *1/00*
U.S. Cl. 117—227 **27 Claims**

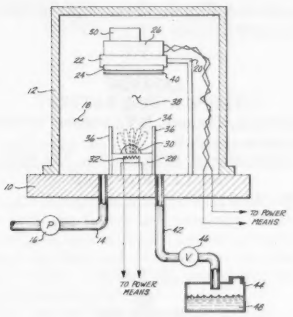
1. In combination with a steel structural member having a mechanically pre-cleaned surface, a primer coating whereby the primed steel can be arc welded by means of a low hydrogen welding electrode at high speed with good weld quality and without primer coating removal, such primer coating being further characterized by excellent bonding qualities and the presentation of a good adhesion surface for a wide range of paints and synthetic coatings, the said primer coating after drying comprising a mixture of:
   a. a resinous material consisting essentially of a prepolymerized, self-curing phenoxy resin mixed with a minor amount of thermoplastic, catalytically polymerized hydrocarbon resin selected from the group consisting of aromatic petroleum resins and terpene phenolic resins;
   b. aluminum powder having a particular size at least predominantly less than about 325 mesh and present in a weight ratio of from about 1:40 to about 1:1 relative to the resinous material, said aluminum powder serving as a pigment, corrosion inhibitor, electrical conductor, exothermic reactant, and deoxidizer;
   c. an inorganic oxide powder selected from the group consisting of iron oxide, chromium oxide, and mixtures thereof, and serving as a coloring constituent and exothermic reactant;

said aluminum powder being present in an amount rendering a dried coating of the composition sufficiently electroconductive to enable initiation of a rod welding arc therethrough, and said inorganic oxide being present in the amount of at least 20% by weight relative to the aluminum powder to provide substantial exothermic reaction therewith and promote localized primer burn-off when the primer coating is heated by rod welding arc.

3,874,922
TANTALUM THIN FILM RESISTORS BY REACTIVE EVAPORATION

Reid A. Mickelsen, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Aug. 16, 1973, Ser. No. 389,064
Int. Cl. B44d *1/02;* **C23c** *13/02*
U.S. Cl. 117—227 **1 Claim**



1. In a process for the deposition of tantalum on a substrate by an evaporative process within a substantially evacuated chamber for the purpose of forming resistive elements of electronic circuits upon the substrate, a method of controlling the resistive value and the repeatibility of the resistive value of the resistive elements thus formed by controlling the substrate temperature and the residual water partial pressure within the substantially evacuated chamber according to the relationship:

$$(2{,}120/T_s) + \log ({}^{p}H_2o/1.1r^*) = B$$

where:

T_s = substrate temperature (°K),

${}^{p}H_2O$ = water partial pressure (torr),

r^* = tantalum deposition rate (A/sec.), and

$-1.5 \leq B \leq -1.1$

and wherein:

a. $298°K \leq T_s \leq 673°K$,

b. 1×10^{-8} torr $\leq {}^{p}H_2O \leq 1 \times 10^{-4}$ torr, and

c. 0.1 A/sec. $\leq r^* \leq$ 10 A/sec.

3,874,923
MODIFIED FERROMAGNETIC CHROMIUM DIOXIDE COMPOSITION AND METHOD OF PREPARING THE SAME

Ugo Montiglio, Pierfrancesco Aspes, and Giampiero Basile, Alessandria, both of Italy, assignors to Montecatini Edison S.p.A., Milan, Italy

Filed Apr. 11, 1973, Ser. No. 350,033
Claims priority, application Italy, Apr. 22, 1972, 23466/72
Int. Cl. C01g *37/02*
U.S. Cl. 117—235 **16 Claims**

1. A modified ferromagnetic chromium dioxide composition, consisting of about 55 to 62 percent by weight of chromium, said chromium being combined with oxygen, and from about 0.005 to 10 percent by weight of a modifier selected from the group consisting of lanthanum, yttrium, strontium and barium, and mixtures thereof in the form of the oxide(s), the balance being oxygen, said composition being in the form of acicular particles having a length less than 2μ and an axial length to width ratio greater than 2:1 and having a tetragonal crystalline structure of the rutile type; said composition having a coercive force greater than 280 Oersteds, a saturation magnetization greater than 60 e.m.u./g and a residual magnetization greater than 25 e.m.u./g.

5. The method of claim **2**, wherein the modifier which is admixed is barium, barium oxide, or a barium salt, and wherein the amount of modifier is such as to provide from 0.05 to 2 percent by weight of barium, expressed as metal, based on the anhydrous salt.

3,874,924
NON-HYGROSCOPIC, WATER-SOLUBLE SUGAR PRODUCTS AND PROCESS FOR PREPARING THE SAME

Michael A. Sands, Hackensack, N.J., and Santino Paul Marino, Tarrytown, N.Y., assignors to CPC International, Inc., Englewood Cliffs, N.J.

Filed Sept. 13, 1973, Ser. No. 397,189
Int. Cl. A23g *3/00;* **C13f** *3/00*
U.S. Cl. 127—29 **17 Claims**

1. A copulverized, non-hygroscopic, free-flowing, water-soluble sugar composition comprising a white sugar component copulverized with a "pulverizing aid" in the form of a water-soluble maltodextrin having a measurable dextrose equivalent value not substantially above about 20, said "pulverizing aid" ranging from about 5 percent to about 20 percent by weight of said sugar composition, said sugar composition having an average particle size range such that at least about 95 percent passes through a 325 mesh screen, said sugar composition having a ratio of weight average particle size to number average particle size of less than about 2.

3,874,925
PROCESS FOR EXTRACTING SUGAR FROM SUGAR-CONTAINING PLANTS

Marcel Loncin, Sint-Pieters-Leeuw, Belgium, assignor to Granimar A.G., Luxemburg, Great Duchy of Luxemburg, Belgium

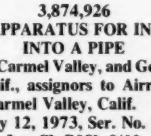
Filed Dec. 8, 1972, Ser. No. 313,384
Claims priority, application Belgium, Dec. 13, 1971, 111629
Int. Cl. C13d *1/02, 1/08*
U.S. Cl. 127—44 **16 Claims**

1. In a process for extracting sugar from sugar-containing plants by diffusion with water, wherein the improvement comprises adding iodacetone as inhibiting agent for the development of thermophilous bacteria to the diffusion water.

3,874,926
METHOD AND APPARATUS FOR INJECTING FOAM INTO A PIPE

Frederick F. Horne, Carmel Valley, and Gerald G. Vanderlans, Lodi, both of Calif., assignors to Airrigation Engineering Company, Inc., Carmel Valley, Calif.

Filed July 12, 1973, Ser. No. 378,524
Int. Cl. B08b *9/02*
U.S. Cl. 134—24 **10 Claims**



10. A method for injecting foam into a pipe comprising:

inserting into said pipe a foam-conducting flexible tube having an inlet and an outlet at a terminal portion where the tube wall has an outlet surrounded by an inflatable plugging portion, which can be enlarged by inflation to bear against the wall of the pipeline so as to prevent foam from flowing back between the tubes and the pipeline,

sending air under pressure to said plugging portion to inflate it and plug said pipe,

retaining said inflation during foam injection,

generating said foam exterior to said pipe,

delivering said foam under pressure to said inlet of said foam-conducting tube and then through to said outlet.

3,874,927

METHOD OF WASHING SOILED CULINARY ARTICLES

John W. Willard, Sr., Rapid City, S. Dak., assignor to CAW Industries, Inc., Rapid City, S. Dak.

Continuation-in-part of Ser. No. 317,097, Dec. 20, 1972, , which is a continuation of Ser. No. 108,198, Jan. 20, 1971, abandoned. This application Aug. 16, 1973, Ser. No. 388,776

Int. Cl. B08b *3/08*

U.S. Cl. 134—25 A **37 Claims**

1. A method of washing soiled culinary articles having food deposits adhering to the surface thereof comprising

intimately contacting the soiled culinary articles with water containing an effective amount of a catalyst until at least a portion of the said food deposits are removed from the surface thereof,

the catalyst being prepared by a process comprising admixing a water soluble alkali metal silicate with an aqueous medium containing a dissolved substance which provides calcium ions in the aqueous medium and a dissolved substance which provides magnesium ions in the aqueous medium,

the aqueous medium containing said dissolved substances in amounts to provide a total concentration in the aqueous medium of between about 1×10^{-4} and 1×10^{-1} mole per liter each of calcium ions and magnesium ions,

the aqueous medium containing said dissolved substances in amounts to provide a molar ratio of calcium ions to magnesium ions between about 2.0:1.0 and 1.0:2.0,

the alkali metal silicate having an alkali metal oxide to silicon dioxide ratio between about 0.9:1.0 and less than 2.0:1.0 and being admixed with the aqueous medium in an amount of about 0.05–2 moles per liter,

reacting the alkali metal silicate with said dissolved substances providing calcium ions and magnesium ions to produce an aqueous suspension of finely divided particles of the reaction product,

admixing a micelle-forming surfactant with the aqueous medium in an amount to form catalyst micelles including said finely divided particles of the reaction product upon agitating the aqueous medium, and

agitating the aqueous medium containing said finely divided particles of the reaction product and surfactant to form said catalyst micelles,

the said resulting aqueous medium being diluted with at least 100 volumes of water prior to washing the soiled culinary articles therein and the said catalyst micelles being present therein in a concentration effective to promote the removal of the said food deposits.

3,874,928

HERMETICALLY SEALED SECONDARY BATTERY WITH LANTHANUM NICKEL ANODE

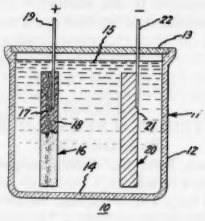
Fritz G. Will, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed June 29, 1973, Ser. No. 374,907

Int. Cl. H01m *35/02*

U.S. Cl. 136—6 R **4 Claims**

1. A hermetically sealed secondary battery comprising a casing, at least one solid cathode positioned within the casing, at least one hydrogen gas diffusion anode of lanthanum nickel positioned within the casing and spaced from the cathode, and



an aqueous alkaline electrolyte in contact with both the cathode and the anode.

3,874,929

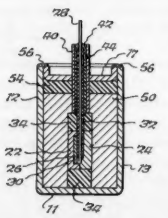
LITHIUM-IODINE BATTERY

Wilson Greatbatch, Clarence, N.Y., assignor to Wilson Greatback Ltd., Clarence, N.Y.

Filed Mar. 5, 1973, Ser. No. 338,101

Int. Cl. H01m *17/02*

U.S. Cl. 136—83 R **15 Claims**



1. A lithium-iodine cell comprising:

a. a casing of electrically conducting material;

b. anode means positioned within said casing and comprising an element of lithium having an exposed surface portion and another surface portion;

c. electrical conductor means operatively connected to said other surface portion and extending through said casing;

d. means for sealing said conductor means from the remainder of said cell said sealing means comprising a ferrule surrounding said conductor means in speaced, generally concentric relationship therewith and a seal of a material which is non-reactive with iodine between said ferrule and said conductor means, said ferrule being sealed at one end to said anode means and extending along the portion of said conductor means within said casing;

e. cathode means comprising iodine-containing material within said casing and in operative contact with said exposed surface portion of said lithium element and with a major portion of the surface of said casing in a manner such that said casing serves as a cathode current collector; and

f. said sealing means shielding said conductor means from said iodine-containing material and electrically insulating said conductor means from said casing;

g. whereby an electrical potential difference exists between said conductor means and said casing during operation of said cell.

3,874,930
FUEL CELL SYSTEM INCLUDING SOURCE OF FUEL CONTAINING HYDROGEN SULFIDE AND METHOD OF USING

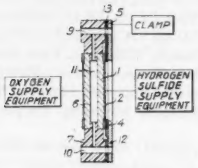
Franz A. Pohl, Gotzenhain; Harald Bohm, Oberursel, and Joachim Heffler, Grossauheim, all of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H, Frankfurt, Germany

Filed Jan. 29, 1970, Ser. No. 6,883

Claims priority, application Germany, Feb. 1, 1969, 1905056

Int. Cl. H01m *27/30*

U.S. Cl. 136—86 E **27 Claims**



1. A fuel cell system for electrochemically oxidizing gaseous hydrogen sulfide to produce electric current therefrom comprising:

a. a fuel cell containing a fuel electrode resistant to poisoning by hydrogen sulfide and consisting essentially of at least one compound selected from the group consisting of tungsten disulfide and molybdenum disulfide, and an additive which is electrically conductive and inert to hydrogen sulfide;

b. gaseous fuel at least containing hydrogen sulfide in contact with said fuel electrode; and

c. supply means connected to said fuel cell and containing gaseous fuel at least containing hydrogen sulfide for supplying said hydrogen sulfide containing gaseous fuel to said fuel electrode.

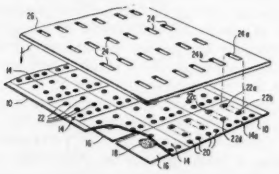
3,874,931
SOLAR CELL ARRAY

Joseph Gabrial Haynos, Rockville, Md., assignor to Communications Satellite Corporation (Comsat), Washington, D.C.

Division of Ser. No. 273,578, July 20, 1972,. This application Aug. 21, 1973, Ser. No. 390,267

Int. Cl. H01l *15/02*

U.S. Cl. 136—89 **2 Claims**



1. A solar cell array comprising: a plurality of individual solar cells, each having top and bottom electrodes, arranged on a flexible substrate in a matrix of rows and columns of cells, each column of cells being electrically connected to adjacent columns of cells by an interconnector connected between the top electrodes of the cells of one column and the bottom electrodes of the adjacent column, said substrate having apertures underlying the position of interconnection of every bottom electrode and every interconnector, and adhesive means between the bottom of each cell and said substrate in areas other than the area including said apertures.

3,874,932
DRY CELLS

Yoshio Uftani; Rokurou Ikebata; Takayuki Togo, and Tugiyasu Iwamaru, all of Osaka, Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed June 15, 1973, Ser. No. 370,433

Int. Cl. H01m *17/00*

U.S. Cl. 136—103 **17 Claims**

1. A dry cell comprising a zinc anode, a depolarizing mix and a separator which functions to separate the anode from the depolarizing mix, said depolarizing mix containing manganese dioxide as its main component and acetylene black immersed in an electrolyte having zinc chloride as its main ingredient, said depolarizing mix containing water and chlorine in an amount of about 50 to 90 parts by weight and about 5.5 to 14.5 parts by weight, respectively, per 100 parts by weight of manganese dioxide, the chlorine being present in the form of said zinc chloride or zinc chloride with added hydrochloric acid.

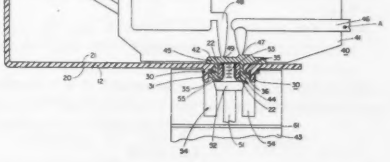
3,874,933
METHOD FOR CASTING BATTERY TERMINALS

Verlin A. Mocas, Indianapolis, Ind., assignor to The Richardson Company, Des Plaines, Ill.

Filed Oct. 27, 1972, Ser. No. 301,568

Int. Cl. H01m *5/00, 35/18*

U.S. Cl. 136—135 S **15 Claims**



1. A method for forming a metal terminal extending within and through a wall of a battery container having a thickness of less than about 0.2 inches and fabricated of a thermally deformable plastic material having a softening point below about 300°F. said terminal providing electrical conduction between the interior and exterior of such container which method comprises:

1. providing a wall of such container with a port adapted for receiving and holding a terminal
2. injecting molten metal under high pressure into such port and within a die mold cavity positioned about the port to shape the molten metal into a terminal of a unitary member having the desired shape said high pressure being sufficient to force the molten metal into and through the die cavity and in the desired excess quantity
3. regulating the quantity of heat energy introduced into the die cavity so that the metal freely flows to form the desired shape of the terminal and solidifies without destroying the structure or composition of such port and wall, said regulation achieved by controlling the temperature of the metal initially within the range of from about 620° to 750°F and by injecting a quantity of molten metal into the die cavity in excess of the volume of such cavity and allowing such excess to flow out of the cavity prior to solidification of the metal, said excess ranging from about 3.0 to about 6.0 volumes of metal per unit volume of the die cavity, and
4. recovering the container with the solidified terminal extending within and through the wall in the desired shape with desirable electrical properties and providing a fluid tight seal about the terminal between the interior

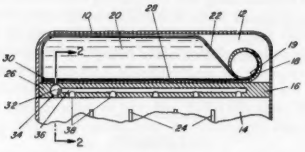
and exterior of the container without the necessity of any further sealing procedure.

3,874,934

BATTERY FILLING DEVICE

Roy A. Zangrando, 43 Wenonah Ave., Lake Hiawatha, N.J. 07034

Filed Mar. 8, 1974, Ser. No. 449,430
Int. Cl. H01m 7/00
U.S. Cl. 136—162 **4 Claims**



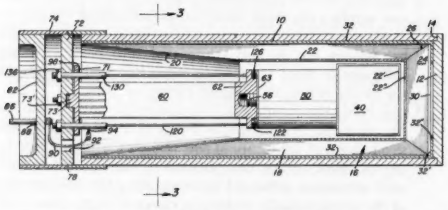
1. A battery filling device which comprises:
a housing having an upper chamber section and a lower chamber section;
a manifold section separating said upper and lower chambers;
a flexible container positioned in said upper chamber;
a low conductivity electrolyte contained within said container when said device is in an inactivated condition;
valve means for dispensing said electrolyte from said container to said lower chamber through said manifold section;
means for squeezing said container and for forcing said electrolyte from said container when said valve means is actuated; and
means for locking said valve means in a normally closed position when said device is in said inactivated condition.

3,874,935

RADIOISOTOPICALLY HEATED THERMOELECTRIC GENERATOR WITH WELD BRAZED ELECTRICAL CONNECTIONS

David Earl Goslee, White Marsh, and Harold Newton Barr, Baltimore, both of Md., assignors to Nuclear Battery Corporation, Columbia, Md.

Filed Oct. 18, 1971, Ser. No. 189,837
Int. Cl. H01R 1//12; G21H 1//10
U.S. Cl. 136—202 **5 Claims**



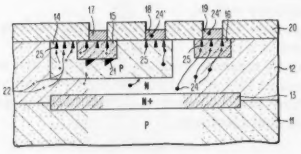
1. In a thermoelectric generator including a radioisotopic heat source, a thermopile for converting heat energy into electrical energy, and a container for holding and enclosing the radioisotopic heat source and the thermopile, said thermoelectric generator sized sufficiently small so that is can be received in the human body without rejection: a thermopile composed of a plurality of closely packed, parallel-oriented, elongated, small cross-section semiconductor elements, said semiconductor elements separated from one another by a thin layeer of insulation, said semiconductor elements together forming a block having end surfaces in which are exposed the ends of each of the elements and the insulation layer therebetween with electrical interconnections between selected pairs of said elements, said thermopile further characterized in that said electrical connections are made by elongated straps bent over at their ends with the bent over ends weld brazed with the ends of said elements, the straight central portions of each strap extending between the elements slightly raised above their end surfaces.

3,874,936

METHOD OF GETTERING IMPURITIES IN SEMICONDUCTOR DEVICES INTRODUCING STRESS CENTERS AND DEVICES RESULTING THEREOF

Guy d'Hervilly, Fishkill; William A. Edel, Poughkeepsie, both of N.Y.; Jean Jacquemin, Chatenay-Malabry, France, and W. Alfred Westdorp, Hopewell Junction, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 25, 1973, Ser. No. 373,202
Claims priority, application France, June 27, 1972, 72.24036
Int. Cl. H01l 7/54
U.S. Cl. 148—1.5 **6 Claims**

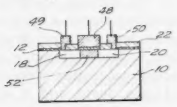


1. A method of gettering impurities, typically metallic atoms, in a monocrystalline silicon device from the active device volume to avoid formation of pipes which result in shorts between two regions of identical conductivity and of a first type of conductivity separated by a region of a second type of conductivity opposite to said first type and/or precipitates or preprecipitates which result in soft junctions, characterized in that it comprises the steps of
introducing semiconductor dopants into a monocrystalline silicon body to form the base region, the emitter region, and collector contact region of a transistor,
providing a masking layer on the surface of said silicon body, having at least contact openings exposing emitter and collector contact regions of the transistor,
introducing substitutional impurity atoms into the exposed regions of the transistor under conditions that produce shallow impurity regions of high impurity concentrations, said substitutional impurity atoms having a solid solubility limit in silicon that is less than the impurity concentration of at least the emitter concentration, said concentrations at or near the solubility limit of the substitutional impurity in the silicon material, said impurity regions forming highly stressed volumes,
heating the silicon body to cause gettering of said metallic atoms by said highly stressed volumes.

3,874,937
METHOD FOR MANUFACTURING METAL OXIDE SEMICONDUCTOR INTEGRATED CIRCUIT OF REDUCED SIZE

Robert J. Huber, Bountiful, and Kent F. Smith, Salt Lake City, both of Utah, assignors to General Instrument Corporation, Newark, N.J.

Filed Oct. 31, 1973, Ser. No. 411,444
Int. Cl. H01l *7/54*
U.S. Cl. 148—1.5 **15 Claims**

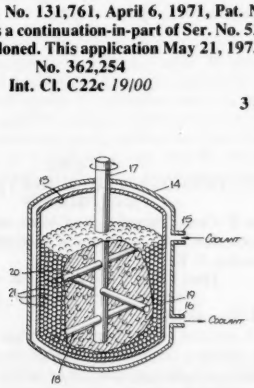


1. In a method of manufacturing a metal oxide semiconductor of the type formed by doping a substrate of a first conductivity type with second conductivity type determining impurities to form separate source and drain regions therein which are separated by a channel region having a length equal to the space between the source and the drain and a width equal to the interface between the source or drain and the channel region, having a thin insulating layer covering the channel region, a thick insulating layer covering the remainder of the substrate and a metallic gate electrode formed over the entire length and a portion only of the width of the channel region such that part of the thin insulating layer is exposed, the improvement comprising the step of implanting ions of the first conductivity determining type in the substrate at the areas covered by said exposed thin insulating layer to prevent an uncontrollable conducting path from forming between the source and the drain caused by the exposed insulating layer in the channel region.

3,874,938
HOT WORKING OF DISPERSION-STRENGTHENED HEAT RESISTANT ALLOYS AND THE PRODUCT THEREOF

John Stanwood Benjamin; Robert Lacock Cairns, both of Suffern, and John Herbert Weber, Sloatsburg, all of N.Y., assignors to The International Nickel Company, Inc., New York, N.Y.

Division of Ser. No. 131,761, April 6, 1971, Pat. No. 3,749,612, which is a continuation-in-part of Ser. No. 52,378, July 6, 1970, abandoned. This application May 21, 1973, Ser. No. 362,254
Int. Cl. C22c *19/00*
U.S. Cl. 148—32 **3 Claims**



1. A hot worked, age hardenable, dispersion-strengthened superalloy shape having a composition ranging from about 5% to 60% chromium, about 0.5% to 6.5% aluminum, about 0.5% to 6.5% titanium, up to about 15% molybdenum, up to about 20% tungsten, up to about 10% columbium, up to about 10% tantalum, up to about 3% vanadium, up to about 2% manganese, up to about 2% silicon, up to about 0.75% carbon, up to about 0.1% boron, up to about 1% zirconium, up to about 0.2% magnesium, up to about 6% hafnium, up to about 35% iron, up to about 10% by volume of a refractory dispersoid, and the balance essentially nickel in an amount at least about 40% of the total composition, said superalloy being characterized metallographically by coarse elongated grains oriented in the direction of working of the shape, the elongated grains being further characterized by an aspect ratio of at least about 3 to 1.

3,874,939
HERBICIDAL COMPOSITIONS CONTAINING CYCLOALKYL CARBAMATES AS SOIL LIFE EXTENDERS

Richard W. Fraley, Barberton, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 148,175, May 28, 1971, Pat. No. 3,734,945. This application Dec. 19, 1972, Ser. No. 316,595
Int. Cl. A01n *9/20*
U.S. Cl. 71—111 **21 Claims**

1. A herbicidal composition containing as a herbicidal component a member of the group consisting of isopropyl N-phenylcarbamate, isopropyl N-(3-chlorophenyl)carbamate, N,N-diallyl-2-chloroacetamide, 3,4-dichloropropionanilide, and 3,4-dichloromethacrylanilide, and further containing a 4-halophenol N-cycloalkylcarbamate compound, said cycloalkyl group containing from 3 to 12 carbon atoms, in an amount of from 0.02 to 5 pounds per pound of said member, said amount being sufficient to extend the soil life of said member.

3,874,940
CEMENTATION PROCESS

Carlos Molina Vera; Carlos Vilches Guzman, and Luis Soto-Krebs, all of Santiago, Chile, assignors to Compania de Aero del Pacifico S.A.(Chile), Santiago, Chile

Filed Oct. 27, 1971, Ser. No. 192,939
Int. Cl. C22b *3/00*
U.S. Cl. 75—109 **12 Claims**

1. A process for the continuous precipitation of copper from a head solution thereof onto a metallic iron precipitant comprising:

charging said precipitant to a reactor in the form of granulated particles of substantially plus **10** mesh size which are self-abrading under conditions of agitation, said precipitant being present in an amount sufficient to provide a reaction index of at least 1;

continuously charging said head solution to said reactor and removing spent solution and precipitate;

continuously agitating said head solution and said precipitant to promote solution-precipitant contact and said self-abrasion; and

at least periodically charging additional precipitant to said reactor to maintain said reaction index.

3,874,941
SILVER-METAL OXIDE CONTACT MATERIALS

Akira Shibata, Yokohama, Japan, assignor to Chugai Denki Kogyo Kabushiki-Kaisha, Tokyo, Japan

Filed Feb. 14, 1973, Ser. No. 442,632
Claims priority, application Japan, Mar. 20, 1973, 48-33133; July 20, 1973, 48-80704
Int. Cl. C22c *5/00*
U.S. Cl. 75—173 R **5 Claims**

1. A composite electrical contact material consisting of an alloy composed of 6 to 12 weight percent of indium, and 0.5 to 5 weight percent of tin, the balance being silver, said alloy being formed into a desired configuration and subjected to an internal oxidation.

3,874,942
ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MEMBER

Hirokazu Negishi, Yokohama; Takashi Saito, Tokyo; Takao Komiya; Tatsuo Masaki, both of Yokohama, and Takashi Ihara, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 11,520, Feb. 16, 1970, abandoned. This application Sept. 27, 1972, Ser. No. 292,554
Int. Cl. G03g *5/00*
U.S. Cl. 96—1.5 **5 Claims**

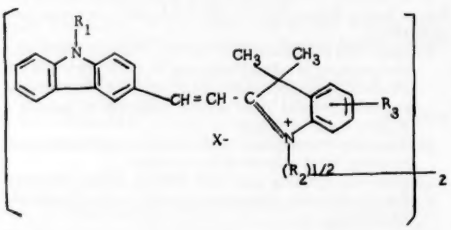
1. An electrophotographic photosensitive member comprising a base, a photoconductive layer and a separate insulating layer on the photoconductive layer at least substantially transparent to actinic radiation and composed of a laminate of an inorganic insulating layer composed of inorganic insulating material having a dielectric constant of at least 2 and an organic insulating material having an insulative resistance of at least 10^{12} ohm-cm, said laminate having a thickness of 1 to 40 microns.

3,874,943
SENSITIZERS FOR ELECTROPHOTOGRAPHY

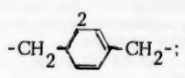
Syu Watarai; Yoshio Seoka, and Hisatake Ono, all of Osaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 29, 1973, Ser. No. 364,263
Claims priority, application Japan, May 31, 1972, 47-54496
Int. Cl. G03g *5/04*
U.S. Cl. 96—1.6 **6 Claims**

1. An electrophotographic photosensitive material comprising an organic photoconductor sensitized by a dimerized cyanine dye having a carbazole nucleus represented by the general formula



wherein R_1 represents a hydrogen atom; an alkyl group having 1–5 carbon atoms; an alkyl group substituted by a halogen atom, a hydroxyl group, or a cyano group; or an acyl group substituted by a halogen atom, a hydroxyl group, or a cyano group; R_2 represents $+CH_2+_n$ where n is a positive integer of 2 to 6 or



R_3 represents a hydrogen atom, a halogen atom, a nitro group, an alkyl group, —OR′, or —COOR′, wherein R′ is an alkyl group having 1–5 carbon atoms; and X represents an anion residue.

3,874,944
DIFFUSION TRANSFER PROCESSES EMPLOYING PERMANENT LAMINATE FILM UNITS

Lucretia J. Weed, Boston, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 31, 1969, Ser. No. 889,466
Int. Cl. G03c *5/54*
U.S. Cl. 96—29 R **5 Claims**

1. A photographic process which comprises, in combination, the steps of exposing a photographic film unit comprising a permanent laminate which contains a common transparent support carrying on one surface, in order, a first layer comprising silver precipitating nuclei; a layer comprising a photosensitive silver halide; and a second layer comprising silver precipitating nuclei, contacting said exposed silver halide layer with an aqueous processing composition containing a silver halide developing agent and a silver halide solvent thereby providing a visible silver image to said film unit in terms of the unexposed areas of said silver halide layer as the function of the point-to-point degree of exposure thereof, and maintaining said laminate intact subsequent to processing.

3,874,945
METHOD OF FABRICATING PLASTIC PRINTING PLATES

Vaclav Misek, 8515 Colonial Dr., Stockton, Calif. 90680

Continuation-in-part of Ser. Nos. 163,008, July 15, 1971, abandoned, and Ser. No. 233,883, March 13, 1972, abandoned. This application Feb. 7, 1973, Ser. No. 330,290
Int. Cl. G03c *5/00*; **G03f** *7/00*
U.S. Cl. 96—36.3 **25 Claims**

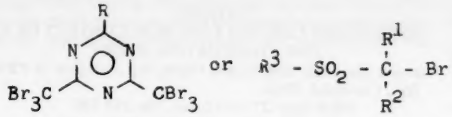
1. A method of fabricating a printing plate comprising the steps of: providing a plate matrix at least a part of one surface of which comprises a soluble plastic material which is capable of having its surface rendered water-wettable by treatment with a chemical solution; treating said portion of said surface with said; composition; applying a photoresist image to said treated portion of said surface; and etching away the remaining areas of said treated portion of said surface uncovered by the pattern of said image wherein said treatment solution comprises 1 to 5 percent by weight sodium dodecyl benzene sulfonate, 5 to 25 percent by weight trisodium phosphate and approximately 0.9 percent by weight sodium hypochlorite, with adequate water for processing.

3,874,946
PHOTOTHERMOGRAPHIC ELEMENT, COMPOSITION AND PROCESS

Lorenzo F. Costa; James A. Van Allan, and Frank Grum, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 19, 1974, Ser. No. 443,892
Int. Cl. G03c *1/02*, *1/34*, *5/34*
U.S. Cl. 96—48 HD **19 Claims**

18. A method of developing an image in a photothermographic element comprising a support having thereon a layer comprising (a) photographic silver halide in association with (b) an oxidation-reduction image-forming combination comprising (i) a silver salt oxidizing agent with (ii) a reducing agent, (c) a polymeric binder and (d) a bromine compound stabilizer precursor comprising a compound represented by the structure:



wherein

R is alkyl containing 1 to 6 carbon atoms,

R^1 is hydrogen or a bromine atom,

R^2 is a bromine atom or a carbamoyl group,

R^3 is an aromatic chromophore group which has the property of imparting to said bromine compound stabilizer precursor the ability to absorb electromagnetic radiation having a wavelength between about 250 and 385 nm; and at least one of R^1, R^2 and R^3 is or contains a bromine atom,

comprising overall heating said element to about 80°C. to about 170°C.

3,874,947

PROCESS FOR THE PRODUCTION OF POLYMER IMAGES

Yoshihide Hayakawa, and Masato Satomura, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 848,085, Aug. 6, 1969, abandoned. This application Oct. 4, 1972, Ser. No. 295,079

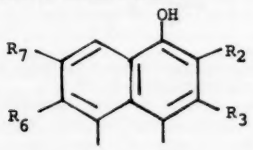
Claims priority, application Japan, Aug. 20, 1968, 43-59401

Int. Cl. G03c *1/70, 1/68*

U.S. Cl. 96—51 **33 Claims**

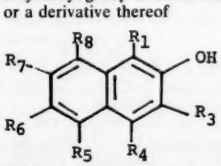
1. A process for the formation of a polymer image which comprises exposing a photographic silver halide emulsion so as to provide a latent image and subsequently, developing said latent image in the presence of one monomer of the group consisting of a vinylidene monomer and a vinyl monomer, and in the presence of at least one reducing agent compound selected from those represented by the following formulas:

i. α-naphthol or a derivative thereof



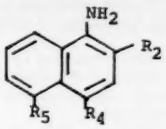
wherein R_2 represents a hydrogen atom, a sulfone group, a substituted arylazo group or a chlorine atom; R_3 represents a hydrogen atom, or a sulfamoyl group; R_4 represents a hydrogen group, a sulfone group or a chlorine atom; R_5 represents a hydrogen atom, a sulfone group, a hydroxyl group, an amino group, or an acylamino group; R_6 represents a hydrogen atom, a carboxyl group or a sulfone group; and R_7 represents a hydrogen atom, a hydroxyl group or an amino group;

ii. β-naphthol or a derivative thereof



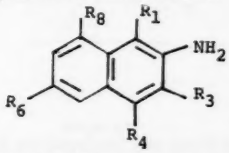
wherein R_1 represents a hydrogen atom, a formyl group, a sulfone group, a carboxyl group, a nitroso group, an arylazo group or an amino group; R_3 represents a hydrogen atom, —CONHR′ (R′ represents an aryl group or an alkyl group), or a hydroxyl group; R_4 represents a hydrogen atom, a chlorine atom or a sulfone group; R_5 represents a hydrogen atom or a nitro group; and R_6, R_7 and R_8 each represents a hydrogen atom or a sulfone group;

iii. α-naphthylamine or a derivative thereof



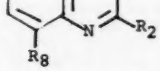
wherein R_2 represents a hydrogen atom, a substituted alkyl group, an amino group, or a hydroxy group; R_4 represents a hydrogen atom or a sulfone group, and R_5 represents a hyrogen atom, an amino group or a hydroxyl group;

iv. β-naphthylamine or a derivative thereof



wherein R_1 represents a hydrogen atom or an amino group; R_3 represents a hydrogen atom, a sulfone group or an amino group; R_4 represents a hydrogen atom or a sulfone group; R_6 represents a hydrogen atom or a sulfone group, and R_8 represents a hydrogen atom, a sulfone group or a hydroxyl group; and

v. oxyquinoline derivative



wherein when R_8 is a hydroxyl group, R_2 represents a hydrogen atom or a carboxyl group and R_4 represents a hydrogen atom or a hyroxyl group; and when R_4 is a hydroxyl group, R_2 represents a carboxyl group and R_8 represents a hydrogen atom; whereby said monomer is selectively polymerized at the areas having said latent image in the presence of a sulfite ion and a developing agent, said sulfite ion being present in at least 0.04 mol per liter.

3,874,948

SILVER HALIDE COLOR DEVELOPER CONTAINING KETOMETHYLENE PHOTOGRAPHIC COLOR-FORMING COUPLERS

Stanley S. Kertel, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

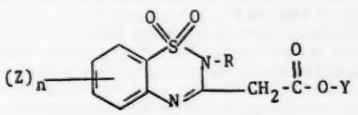
Division of Ser. No. 347,609, April 3, 1973, Pat. No. 3,841,880. This application May 1, 1974, Ser. No. 465,982

Int. Cl. G03c *7/00*

U.S. Cl. 96—56.3 **4 Claims**

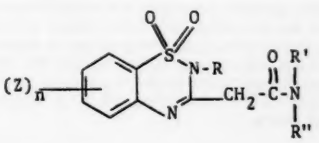
1. A color developing composition comprising a silver halide color developing agent and diffusible color-forming coupler represented by the formula:

(1)



or

(2)



wherein

R is hydrogen or an alkyl containing 1–5 carbon atoms;

Y is an alkyl group containing 1–5 carbon atoms or an aryl group;

R′ is hydrogen or alkyl containing 1–5 carbon atoms;

R″ is an alkyl containing 1–5 carbon atoms, phenyl, halo-substituted phenyl, alkyl-substituted phenyl or alkoxy-substituted phenyl group;

Z is halo, a lower alkoxy group or a lower alkyl group; and

n is 0–2;

said coupler being soluble in a water solution of said color developing composition.

3,874,949

PROCESS FOR DECORATING AN ALUMINUM SUBSTRATE WITH A COLORED DESIGN

Kazuyoshi Kaneda; Yasushi Suzuki, and Yasuo Aoshima, all of Shizuoka, Japan, assignors to Riken Lightmetal Industry Company, Limited, Shizuoka-shi, Sizuoka-ken, Japan

Filed Aug. 30, 1972, Ser. No. 284,877

Claims priority, application Japan, Aug. 31, 1971, 46-66804; Aug. 31, 1971, 46-66805; Aug. 31, 1971, 46-66807

Int. Cl. C23f *7/26, 7/08*

U.S. Cl. 148—6.27 **8 Claims**

1. A process for forming on an aluminum or aluminum alloy surface a colored design or pattern which comprises: degreasing, cleaning and water-rinsing the surface, etching the water-rinsed surface with an alkaline solution, neutralizing and water-washing the etched surface, printing or coating a masking agent on a limited area of the surface, subjecting the surface while the masking agent is thereon to a first film forming step, removing the masking agent from the surface, and subjecting the surface to a second film forming step, whereby the second film covers areas of the surface subjected to the first film forming step and areas of the surface covered by the masking agent.

3,874,950

PROCESSING OF STEEL BARS AFTER HOT ROLLING

John David Grozier, Bethel Park, and John Ray Bell, Pittsburgh, both of Pa., assignors to Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 768,163, Oct. 16, 1968, abandoned. This application Feb. 23, 1971, Ser. No. 118,087

Int. Cl. C21d *7/14*

U.S. Cl. 148—12 C **3 Claims**

1. The method of processing steel bars of cold-heading grade immediately after hot rolling to produce optimum cold-heading properties, the hot-rolling finishing temperature being above 1,500°F., including a fast cooling step followed by a slow cooling step, the fast cooling step comprising cooling the hot bar to a temperature not greater than about 1,500° F. but above its lower transformation temperature at a cooling rate not less than about 300° F. per minute but not great enough to form bainite or martensite at the bar surface, and the slow cooling step comprising cooling the bar through its lower transformation temperature to a temperature of not more than about 1,200° F. at a cooling rate not greater than about 10° F. per minute.

3,874,951

METHOD FOR CONTROLLING IRON CONTENT OF A ZINC PHOSPHATING BATH

Edward Alexander Hill, Scotch Plains, N.J., assignor to TRW Inc., Cleveland, Ohio

Filed Sept. 27, 1972, Ser. No. 292,595

Int. Cl. C23c *1/00;* **C23f** *5/02;* **B05c** *11/10*

U.S. Cl. 148—6.15 Z **7 Claims**

1. A method of controlling the iron content of a phosphating bath which comprises constantly agitating the bath by means of a continuously operated mixing device disposed in the work processing tank to provide a strong surface turbulence in the bath and thereby to promote aeration in the bath and precipitate dissolved iron compounds out of solution in the bath and maintain the iron precipitate in suspension in the bath, continuously purging iron precipitate from the bath by circulating bath solution from the work processing tank through at least one auxiliary tank wherein iron precipitate settles out of suspension in the bath solution, and continuously discharging clarified bath solution from the auxiliary tank back to the work processing tank.

3,874,952

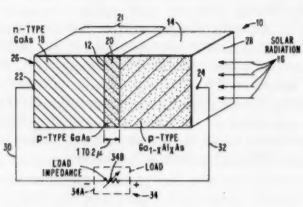
METHOD OF DOPING DURING EPITAXY

Jerry M. Woodall, White Plains, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 837,755, June 30, 1969, Pat. No. 3,675,026. This application June 30, 1972, Ser. No. 267,880

Int. Cl. H01l *7/38*

U.S. Cl. 148—171 **13 Claims**



1. A method for establishing a p-n junction in a semiconductor region, comprising the steps of:

establishing a region of binary semiconductor compound with a given conductivity type determining dopant therein;

growing by liquid phase epitaxy a region of ternary semiconductor compound on said binary semiconductor compound with an opposite conductivity type determining dopant therein; and

doping said binary semiconductor compound with said opposite conductivity type determining dopant from said region of said ternary compound by diffusion to establish said p-n junction in said region of said binary semiconductor compound proximate to the interface between said binary and said ternary semiconductor regions.

3,874,953

METHOD OF HARDENING SAWS

Vladimir Viktorovich Idel, ulitsa Gersena, 3, kv. 37, Zavolzhie Gorkovskoi oblasti, U.S.S.R.

Continuation of Ser. No. 300,361, Oct. 24, 1972, abandoned. This application Jan. 17, 1974, Ser. No. 434,222

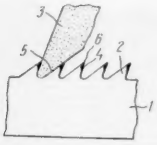
Claims priority, application U.S.S.R., Oct. 25, 1971, 1706661; Mar. 9, 1972, 1752608; Mar. 9, 1972, 1752609

Int. Cl. C21d *9/24*

U.S. Cl. 148—12.4 **4 Claims**

1. A method of hardening saws comprising the steps of: hardening of an entire saw blade to a 52 Rockwell C; additionally hardening the saw teeth to 65 Rockwell C effected during the sharpening of said saw teeth by an abrasive disk, said

abrasive disk heating either a front face or a back edge and the cutting edges of each tooth to the temperature which is close to the melting temperature of the saw material, and then



quenching to the tempering temperature by an air stream resulting from the rotation of said abrasive disk; and allowing a subsequent slow cooling of said either front face or back edge and said cutting edges to the ambient temperature.

3,874,954

METHOD OF PREPARING IRON SILICON ALLOYS WITH HIGH SILICON CONTENT FOR COLD WORKING REQUIRING DUCTILITY

Erwin Wildschutz, Krefeld, Germany, assignor to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed May 7, 1971, Ser. No. 141,377

Claims priority, application Germany, May 11, 1970, 2024525

Int. Cl. H01f *1/04*

U.S. Cl. 148—111 **18 Claims**

1. Method of working iron silicon steel alloys having silicon content between 4.5 % to 7.5 % by weight, the remainder being iron and impurities, providing the steps of:

first, hot working a casting of said alloy at a temperature in excess of 650° centrigrade to obtain a first intermediate product;

second, working and forming the first intermediate product into a second intermediate product during cooling from 650° C down to at least 350° C prior to final working; and third, making parts from the unannealed second intermediate product which has not been reheated above 350° C and while avoiding increasing its temperature above 350° C, the making of parts in accordance with the third step excluding rolling and being of the variety which is impeded by brittleness because of formation of edge cracks and burrs, and being one of the following cutting, punching, stamping, the brittleness having been maintained sufficiently low by the second step and by maintaining the temperature below 350° C, so that cracks and burrs are avoided during the cutting, punching or stamping for making such parts.

3,874,955

METHOD OF MANUFACTURING AN MOS INTEGRATED CIRCUIT

Shigeru Arita, Ibaragi, Japan, assignor to Matsushita Electronics Corporation, Osaka, Japan

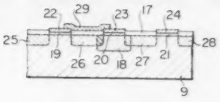
Filed Mar. 15, 1973, Ser. No. 341,493

Claims priority, application Japan, Mar. 17, 1972, 47-27785

Int. Cl. H01l *7/44, 27/10;* **B01j** *17/00*

U.S. Cl. 148—187 **2 Claims**

1. A method of manufacturing an MOS integrated circuit by utilizing the self-alignment technique comprising the steps of: forming into a preselected portion of a silicon substrate of one semiconductivity type of preliminary diffused region of the other semiconductivity type opposite to that of said silicon substrate; forming at least one gate section composed of a gate oxide film and a gate electrode on said silicon substrate so that at least a portion of said gate section associated with said preliminary diffused region is placed on said preliminary diffused region; and forming a plurality of diffused regions so that drain region and source region are provided on the sides of each of said gate sections, whereby each of said gate sections, together with said drain and source regions on the sides thereof, forms an MOS field-effect transistor, and said preliminary diffused region and said gate section placed thereon form a capacitor.



3,874,956

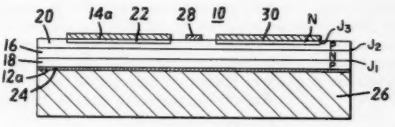
METHOD FOR MAKING A SEMICONDUCTOR SWITCHING DEVICE

Hiroshi Gamo, and Akira Kawakami, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 253,141, May 15, 1972, abandoned. This application Feb. 19, 1974, Ser. No. 443,202

Int. Cl. H01l *7/34*

U.S. Cl. 148—188 **9 Claims**



1. A method for processing a semiconductor wafer comprising the steps of:

a. providing a semiconductor wafer having first and second main surfaces;

b. diffusing an impurity into said wafer having a lower impurity concentration in the vicinity of said first main surface by

i. forming a high concentration phosphorus-containing region adjacent to said first main surface by forming a phosphorus-containing layer on at least said first main surface and heating the wafer and the phosphorus-containing region,

ii. then forming an impurity layer on at least said second main surface,

iii. then diffusing the impurity by heating the wafer and said impurity layer;

c. removing the undiffused portion of said phosphorus-containing layer from said first main surface; and

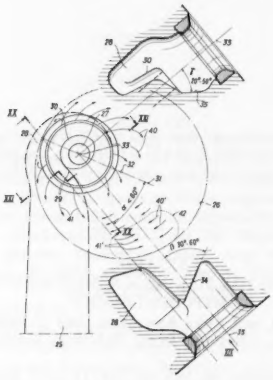
d. attaching a cathode electrode to said second main surface and an anode electrode to said first main surface after the removing of the undiffused portion of said phosphorus-containing layer.

3,874,957

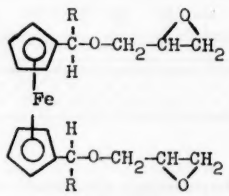
USE OF 1,1'-BIS-(1-GLYCIDOXYLALKYL) FERROCENES IN ROCKET PROPELLANTS

Robert C. Corley, Lancaster, Calif., and Fred M. Dewey, Denver, Colo., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 7, 1970, Ser. No. 31,041
Int. Cl. C06b 19/02
U.S. Cl. 149—5 **4 Claims**



2. A solid rocket propellant comprising a cured binder containing fuel and oxidizer particles and a homopolymer of a compound having the general formula:



wherein R is selected from the group consisting of H, and alkyls having the formulas CH_3, C_2H_5, C_3H_7, C_4H_9, C_5H_{11}, C_6H_{13}, C_7H_{15}, and C_8H_{17}.

3,874,958

METHOD OF MAKING BURNED-OUT FABRIC

Walter Scholtis, Karl-Marx-Stadt; Hans Wallisch, Frankenberg; Wolfgang Stuber, and Sabine Fentos, both of Plauen, all of Germany, assignors to VEB Plauener Spritze, Plauen, Germany

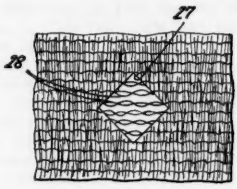
Filed July 23, 1973, Ser. No. 381,442
Int. Cl. D06q 1/02
U.S. Cl. 156—7 **9 Claims**

1. A method of making a patterned fabric comprising the steps of:

combining a body of unspun fibers capable of being dissolved by an etchant with at least one filament not dissolvable by said etchant into a fabric;

locally printing said fabric with a paste of said etchant according to a pattern;

heating the printed fabric to etch away said fibers in the



regions covered by said paste; and

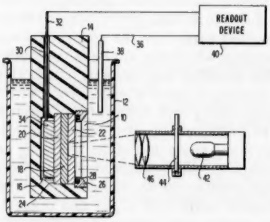
shrinking said filament after etching of said fabric.

3,874,959

METHOD TO ESTABLISH THE ENDPOINT DURING THE DELINEATION OF OXIDES ON SEMICONDUCTOR SURFACES AND APPARATUS THEREFOR

Jan P. Hoekstra, Putnam Valley, and Frederick H. Dill, South Salem, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 21, 1973, Ser. No. 399,668
Int. Cl. B29c 17/08
U.S. Cl. 156—7 **4 Claims**



1. Apparatus for determining the etch endpoint of an oxide from a semiconductor substrate comprising:

container means for holding an etching solution,

substrate holding means for supporting an oxide coated substrate in an etching solution with only one oxide coated surface of said substrate being exposed to said etching solution,

electrical detecting means disposed in operative relation to opposite sides of said substrate for detecting a signal generated by light impinging on a surface of said substrate, and

light source means for directing a beam of light on a portion of the exposed oxide coating to be etched away whereby when the proper amount of oxide has been etched away, the light beam will impinge on the exposed surface of said semiconductor to produce a signal indicating the etch endpoint.

3,874,960

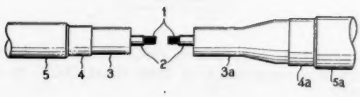
METHOD FOR MUTUALLY CONNECTING SUBMARINE COAXIAL CABLES OF DIFFERENT OUTSIDE DIAMETERS

Akira Matsuzaki, Yokohama, and Terasu Hamura, Tokyo, both of Japan, assignors to Kokusai Cable Ship Kabushiki Kaisha, Tokyo-to, Japan

Continuation of Ser. No. 137,362, April 26, 1971, abandoned. This application Aug. 14, 1973, Ser. No. 388,171

Int. Cl. B21f 15/02

U.S. Cl. 156—49 6 Claims



1. A method for connecting coaxial cables having different cross-sections, each of said cables having an inner conductor, an inner insulator surrounding said inner conductor, an outer conductor surrounding said inner insulator, and an outer insulator surrounding said outer conductor, said method comprising the steps of: providing two coaxial cables one of which has a larger cross-sectional inner insulator, larger outer conductor and larger outer insulator than the other cable; exposing desired lengths of said inner conductor, said inner insulator and said outer conductor of each coaxial cable; shaping the exposed inner insulator of only the larger cross-sectional coaxial cable to form a first portion having a cross-section equal to the cross-section of the inner insulator of the smaller cross-sectional coaxial cable, a second portion having a cross-section equal to the larger cross-sectional inner insulator, and a tapered transistional portion tapering from said second portion to said first portion; connecting the inner conductor of the larger cross-sectional coaxial cable to the inner conductor of the smaller cross-sectional coaxial cable; moulding a layer of insulation around the exposed connected together inner conductors such that the moulded layer contacts both ends of each the inner insulator of the smaller cross-sectional coaxial cable and the first portion of the inner insulator of the larger cross-sectional coaxial cable; placing a layer of conductive material around the moulded layer of insulation, the exposed portions of the inner insulator of the smaller cross-sectional coaxial cable, said first portion, said tapered transistional and said second portion of the larger cross-sectional coaxial cable and around a portion of the exposed outer conductors of each coaxial cable; welding said layer of conductive material to the exposed portion of the outer conductors; and moulding a layer of insulation around said layer of conductive material.

3,874,961

METHOD OF INSULATING AN ELECTRICAL CONDUCTOR

Thor W. Steinert, Lenox, Mass., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 22,102, March 5, 1970, abandoned, which is a division of Ser. No. 644,093, June 7, 1967, abandoned. This application Sept. 13, 1972, Ser. No. 288,820

Int. Cl. H01b 3/52, 13/08

U.S. Cl. 156—53 5 Claims

1. A method of insulating an electrical conductor comprising the steps of lubricating the surface of a paper web with a lubricant which forms a hard, dry, slippery film on the paper, the lubricant being applied to the paper in an amount between 0.001 and 0.025 pounds per thousand square feet of web surface, and after said hard dry film has formed, wrapping the web around the conductor.

3,874,962

APPARATUS FOR THE CONTINUOUS PRODUCTION OF THIN WOOD-WOOL BOARDS

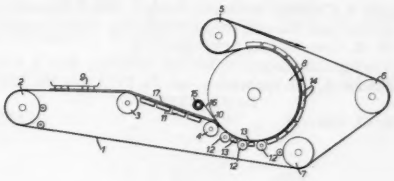
Rolf Gersbeck, Hannover; Reinhold Reschke, Misburg, and Reinhold Posielsky, Langenhagen, all of Germany, assignors to Hermann Berstorff Maschinenbau GmbH, Hannover-Kleefeld, Germany

Continuation-in-part of Ser. No. 188,224, Oct. 12, 1971, abandoned. This application May 8, 1973, Ser. No. 358,303

Claims priority, application Germany, Oct. 14, 1970, 2050325; Mar. 27, 1971, 2114876

Int. Cl. B29j 5/00; B32b 21/02; B29d 7/14

U.S. Cl. 156—62.2 18 Claims



1. A method continuously producing wood-wool boards with thicknesses up to 8 mm comprising the steps of

depositing wood-wool and a binding agent on an endless band to form a continuously deposited layer of wood-wool impregnated with a bonding agent,

preheating the underside of said band by underlying infra-red heating means while said layer is traveling on said band prior to the pressing step,

pressing by means of the band the said layer against a major proportion of the periphery of a heated rotary drum,

applying pressure along a line transverse to the direction of motion of the layer simultaneously with said pressing, the said transverse pressure being substantially in excess of the pressure exerted on the layer by the band and drum alone, said linear pressure being exerted by a heated roller juxtaposed to the drum substantially immediately following a location proximate where said band and said drum initially come into juxtaposition, and applying heat by infrared radiation to the side of said band opposite said drum for the remaining pressing of said layer between said band and the heated periphery of said drum whereby the layer during said remaining pressing is continually heated by both the drum and the band.

3,874,963

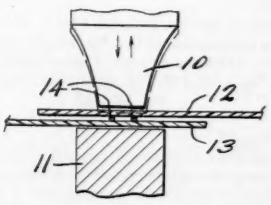
SONIC BONDING PROCESS

Michael B. Barger, Findlay, Ohio, assignor to R. L. Kuss & Co., Inc., Findlay, Ohio

Filed Nov. 8, 1973, Ser. No. 413,879

Int. Cl. B32b 31/20

U.S. Cl. 156—73.2 4 Claims



1. A process for producing a heat-fused joint between members of a thermoplastic article, comprising the steps of:

abutting surfaces of the members to be joined along the path of the intended joint while positioning between the

members along the path of the intended joint at least one separate filamentary energy director of a fusibly compatible thermoplastic material; and

inducing mechanical friction-producing vibrations among the members and energy directors while applying to the members along the path of the intended joint an external clamping force whereby the abutting surfaces of the members to be joined and said fusibly compatible filamentary energy director are fused to one another along a path defined by said energy director.

3,874,964

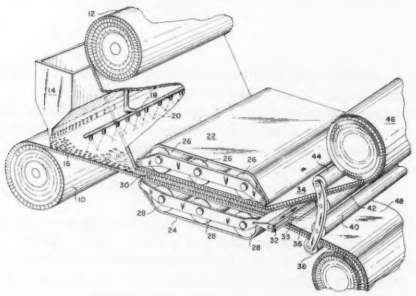
LAMINATED FABRIC AND METHOD

Joseph A. Cogliano, Baltimore; Louis L. Wood, Rockville, both of Md., and Kurt C. Frisch, Grosse Ile, Mich., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 250,012, May 3, 1972, abandoned. This application Apr. 23, 1973, Ser. No. 353,919

Int. Cl. B32b *27/40*

U.S. Cl. 156—78 **22 Claims**



1. A method for preparing a laminated fabric which comprises, foaming a resin reactant and an aqueous reactant component on one surface layer of fabric, laminating a second surface layer of fabric onto the foaming resin reactant, said foam having crosslinking hydrophilic resin reactant, said foam having crosslinking hydrophilic characteristics with three-dimensional network, and consisting essentially of a first component comprising isocyanate capped polyoxyethylene polyol having a reaction functionality greater than two, and a second component comprising aqueous reactant, the ratio of moles H_2O/moles NCO groups in said second and first components respectively being about 6.5 to about 390, splitting the foam layer, and recovering two foam backed laminates.

3,874,965

FIBRILLATED YARN CARPET BACKING

Emmett T. Greenwald, Tenafly, N.J., and Richard A. Kenney, Westport, Conn., assignors to Celanese Corporation, New York, N.Y.

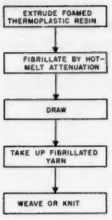
Continuation of Ser. No. 249,428, May 1, 1972, abandoned, which is a continuation of Ser. No. 70,617, Aug. 14, 1970, abandoned, which is a division of Ser. No. 606,573, Jan. 3, 1967, Pat. No. 3,549,470. This application Aug. 13, 1973, Ser. No. 387,843

Int. Cl. B32b *5/20, 31/20*

U.S. Cl. 156—78 **3 Claims**

1. A process for producing a carpet backing comprising:

a. producing a foamed extrudate from a mixture comprising a molten thermoplastic polymer and a foaming agent which is or evolves gas at extrusion temperature, (b) hot-melt attenuating said foamed extrudate at temperatures above the glass transition temperature of the polymer, (c) processing said extrudate to strand form and (d) formulating said strands into a backing fabric wherein said fabric is heat stabilized at temperatures of from about 260°F. to about 300°F. for a period of from about 15 seconds to about 90 seconds and calendered at pressures of from about 300 to about 500 pounds per linear inch at a temperature of from about 260°F. to about 300°F.



3,874,966

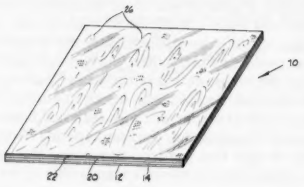
LAMINATED ARTICLE OF MANUFACTURE AND METHOD OF MAKING THE SAME

Leonardo M. Garcia, Salem, N.H., assignor to Johns-Manville Corporation, Greenwood Village, Colo.

Filed Mar. 28, 1973, Ser. No. 345,611

Int. Cl. B32b *31/26*

U.S. Cl. 156—85 **10 Claims**



1. A method of making a decorative laminated article of manufacture, comprising:

a. positioning a plurality of layers of material in stacked relationship to one another with adhesive material between adjacent layers, said layers including

i. an article support layer,

ii. a layer of light-opaque, creasable material positioned over said article support layer, said material including a light-reflective surface facing away from said support layer,

iii. a layer of at least partially transparent and heat-shrinkable plastic material disposed on the reflective surface of said light-opaque layer, and

iv. a layer of at least partially transparent plastic material disposed on said heat-shrinkable layer; and

b. compressing and substantially simultaneously heating said positioned layers so as to cause

i. said layers to bond together,

ii. said heat-shrinkable material to shrink, and

iii. the production of a plurality of randomly located creases in said opaque layer.

3,874,967

ENTRAPPED LIQUID TREATMENT OF LAMINATED FILM

Henry George Schirmer, Spartanburg, S.C., assignor to W. R. Grace & Co., Duncan, S.C.

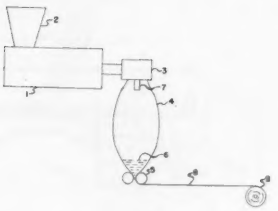
Filed Jan. 29, 1973, Ser. No. 327,358

Int. Cl. B32b *31/30*

U.S. Cl. 156—145 **7 Claims**

1. A process for treatment of an interior layer of a polymeric film laminate by a liquid comprising the steps of:

a. preparing a laminated, tubular, film, the innermost layer of said tubular film being liquid permeable and adjacent to the interior layer to be treated;
b. providing adjustable tube collapsing means;
c. inflating said tubular film in a vertical position whereby the lower end of said tube is closed off by said collapsing means which collapse said tube;
d. providing and maintaining a reservoir of treating liquid in the collapsed end of said tube;



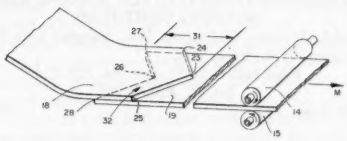
e. adjusting said collapsing means to allow liquid to become entrapped between the collapsed walls of said tube; and, thereafter,
f. collapsing and flattening said tubing to trap said liquid as the central layer of a laminate formed by the walls of said flattened tubing whereby said trapped liquid penetrates said permeable layer and acts upon said treatable layer.

3,874,968

WEB SPLICING METHOD

Norman M. Robinson, Coatesville, Pa., assignor to Certain-teed Products Corporation, Valley Forge, Pa.

Filed Aug. 29, 1973, Ser. No. 392,727
Int. Cl. B32b *31/00*; **B31f** *5/00*
U.S. Cl. 156—154 **6 Claims**



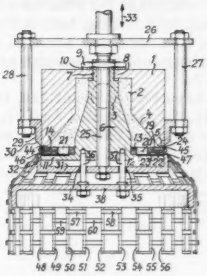
1. The method of splicing the trailing end of a spent web and the leading end of a new web comprising the steps of:
in the leading end of the new web, making a severing cut extending from edge to edge and oriented with respect to the longitudinal axis of the new web and discarding the severed piece;
in the trailing end of the spent web, making a severing cut extending from edge to edge and oriented with respect to the longitudinal axis of the spent web and discarding the severed piece;
applying adhesive adjacent to and along the cut end on at least one of the webs;
overlapping the leading and trailing ends and pressing the same together;
treating the adhesive so that the adhesive bonds the ends together and makes a joined web;
spacing a pair of grinding rolls respectively on opposite sides of the joined web so that the overlapped area can be passed therebetween, the spacing being the same as the thickness of the joined web orienting the axes of the rolls with respect to the longitudinal axis of the joined web;
passing the overlapped area between the rolls by moving the joined web along its longitudinal axis, the cuts in the leading and trailing ends having been oriented respectively with relation to the longitudinal axis of the joined web and the axes of the rolls also having been oriented with relation to the longitudinal axis of the joined web so that in said passage the rolls develop unit forces on the overlapped area to cause the same to shift in a direction normal to the plane of the web whereby the rolls remove material respectively from the opposite sides of the overlapped area so that the thickness of the area is substantially the same as the thickness of the joined web.

3,874,969

PROCESS FOR MAKING PLASTICS MESH STRUCTURES

Jean-Claude Hureau, Maurepas; Benjamin Rota, Noisy le Sec, and Philippe Thomas-Castelnau, Paris, all of France, assignors to Generale Alimentaire, Neuilly-sur-Seine, France

Filed Nov. 8, 1972, Ser. No. 304,818
Claims priority, application France, Nov. 10, 1971, 71.40270; Dec. 15, 1971, 71.45140
Int. Cl. D04h *3/16*
U.S. Cl. 156—167 **9 Claims**



1. A process for making plastics flat or tubular mesh structures and other forms of openwork, such process comprising the steps of:
extruding a plurality of continuous filaments parallel to the direction of extrusion and transversely spaced apart, and separately extruding, periodically and transversely of the continuous filaments, strands that are discontinuous in a transverse direction and extend across less than all of the plurality of filaments, each strand being of a length at least equal to the spacing between two adjacent filaments, whereafter the strands are thrust toward the filaments so as to be welded to the filaments.

3,874,970

METHOD AND APPARATUS FOR PRODUCING FLATTENED FLEXIBLE TUBE STOCK

John William Dunn, Sylvania, Ohio, assignor to Owens-Corning Fiberglass Corporation, Toledo, Ohio

Filed Feb. 3, 1972, Ser. No. 223,165
Int. Cl. B65h *81/00*
U.S. Cl. 156—169 **10 Claims**

1. A method of producing sheet molding compound for use in making glass fiber reinforced molded articles, comprising: depositing a binder forming material and glass fiber reinforcement onto a generally cylindrical surface having a longitudi-

nally extending axis of revolution while the surface is both revolved about its longitudinal axis and is moved longitudinally of said axis to form a revolving flexible envelope, moving the revolving flexible envelope axially off of said generally cylindrical surface while it is revolving, passing the flexible envelope between opposing rollers extending transversely of said longitudinal axis to collapse said envelope while said envelope is revolving, supporting means for rolling the collapsed envelope into a roll transversely to the longitudinal axis of said generally cylindrical surface, and revolving said rollers and last mentioned means end for end transversely of said longitudinal axis generally in synchronism with said generally cylindrical surface while actuating said last mentioned means to produce a roll of said collapsed envelope.

3,874,971

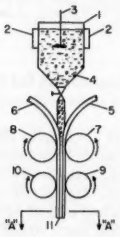
LAMINATED ARTICLE OF METALLIC, POLYMERIC AND WAX IMPREGNATED CELLULOSIC LAYERS AND METHOD OF PREPARATION

Ernest P. Black; Irl N. Duling, both of West Chester; John C. Merges, Jr., Glen Mills, and Alfred F. Talbot, Wallingford, all of Pa., assignors to Sun Research and Development Co., St. Davids, Pa.

Continuation-in-part of Ser. No. 61,718, Aug. 6, 1970, Pat. No. 3,716,441. This application Aug. 31, 1972, Ser. No. 285,404. The portion of the term of this patent subsequent to Feb. 13, 1990, has been disclaimed.

Int. Cl. C09j *5/02*

U.S. Cl. 156—308 **9 Claims**



1. Method of preparing a tri-layer laminated article, having an outer wax-impregnated cellulosic layer, a middle thermoplastic polymeric layer and an outer metallic layer, comprising:

a. establishing a heterogeneous composite of thermoplastic polymer in finely divided form and molten wax, said polymer having an adhesive capacity for both metallic and cellulosic materials and a melting point above the melting point of the wax and being substantially insoluble in molten wax at a temperature below the melting point of the polymer;

b. applying a coating of said heterogeneous composite to an inner surface of an outer metallic layer at a temperature above the melting point of wax but below the melting point of the polymer, the amount of coating being regulated so that substantially all of the wax therein is absorbable in the cellulosic layer;

c. placing the other outer cellulosic layer adjacent said coating and allowing sufficient time to permit the wax to start to absorb into said cellulosic layer and then;

d. heating the coating to a temperature above the melting point of the polymer and pressing the outer layers against the coating to form an essentially continuous molten polymer layer between the metallic layer and cellulosic layer;

e. and thereafter cooling the molten polymer whereby it solidifies resulting in said article.

3,874,972

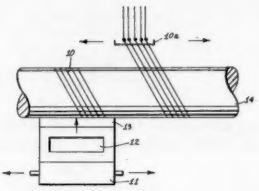
PROCESS FOR THE MANUFACTURE OF IMPROVED REINFORCED GLASS PIPES AND OTHER ARTICLES

Ludwig Wesgh, Heidelberg, Germany, assignor to Mancar-Trust, Vaduz, Liechtenstein

Continuation-in-part of Ser. No. 651,126, July 5, 1967, Pat. No. 3,461,094. This application Aug. 6, 1969, Ser. No. 848,060

Int. Cl. B31c *13/00*

U.S. Cl. 156—169 **2 Claims**



1. A process for the manufacture of high-tensile strength, fiberglass-reinforced artificial fiber resin products with reduced glass content which comprises

alternately combining at least one first layer comprising fiberglass roving strands soaked with resins with at least one second layer comprising a mixture of filler material and liquid resin;

passing said strands through a first bath containing a liquid resin and up to 20 percent by weight of filler material;

and then through a second bath containing a mixture of liquid resin and up to 90 percent by weight of filler material;

thereby producing a non-homogeneous product in which said first and second layers alternate.

3,874,973

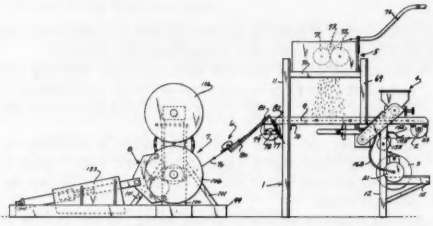
METHOD AND APPARATUS FOR MAKING A SHEET MOLDING COMPOUND

Richard L. Jeanson, Watertown, Wis., assignor to G. B. Lewis Company, Watertown, Wis.

Filed Feb. 5, 1973, Ser. No. 329,524

Int. Cl. B31c *3/00*

U.S. Cl. 156—192 **15 Claims**



1. A method of forming a composite structure, comprising the steps of moving a film of sheet material in a given path, depositing a coating of resin on the film as it is moving in said path, depositing a layer of fibers in haphazard relation on the resin coating to provide a laminate in which the upper surface of the layer of fibers is exposed, said coating of resin and said layer of fibers being spaced from a side edge of said film to provide an exposed side edge portion, folding said side edge portion of the film partially over the coating of resin and the exposed layer of fibers in a first fold, winding the laminate in coiled form to provide a wound coil, and applying pressure to the wound laminate at a series of first spaced locations along the length of the wound coil to thoroughly impregnate the fibers and resin.

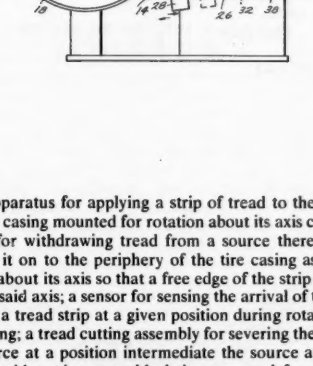
3,874,974
APPLICATION OF TREAD STRIP TO TIRE CASING

Kenneth I. Simmons, Jr., Rt. 1, Hartford City, Ind. 47348

Continuation-in-part of Ser. No. 76,195, Sept. 28, 1970, Pat. No. 3,728,181. This application Mar. 20, 1973, Ser. No. 343,149

Int. Cl. B29h 17/37, 17/372

U.S. Cl. 156—405 8 Claims



1. Apparatus for applying a strip of tread to the periphery of a tire casing mounted for rotation about its axis comprising: means for withdrawing tread from a source thereof and for feeding it on to the periphery of the tire casing as the latter rotates about its axis so that a free edge of the strip progresses around said axis; a sensor for sensing the arrival of the leading edge of a tread strip at a given position during rotation of the tire casing; a tread cutting assembly for severing the strip from the source at a position intermediate the source and the tire casing, said cutting assembly being mounted for adjustment toward and away from said sensor along the path of travel of the tread strip; and control means responsive to the diameter of the tire casing for adjusting the position of said cutting assembly, and hence the distance between said sensor and said cutting assembly along the path of travel of the tread strip such that activation of the sensor occurs at a point in time when said distance equals the circumference of the tire casing, whereby the cutting assembly will sever a strip of tread having a length appropriate to the tire casing being processed.

3,874,975
APPARATUS FOR CUTTING AND WELDING THERMOPLASTICS MATERIALS

Georges Lagain, 14 Rue de Seine, 95100 Argenteuil, France

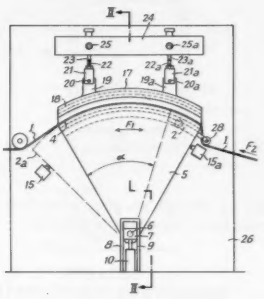
Filed Mar. 18, 1974, Ser. No. 452,391

Claims priority, application France, Mar. 26, 1973, 73.10819

Int. Cl. B32b 31/00; B26d 7/00

U.S. Cl. 156—515 9 Claims

1. Apparatus for cutting and welding a continuously-fed sheath made of thermoplastics material to divide said sheath into a plurality of segments of lesser width, said apparatus including at least one heatable elongated cutting blade having a tapering portion, a grooved table, means for moving said plastics sheath over said table in a direction following the longitudinal axis of said cutting blade, said tapering portion of said cutting blade fitting into one of the grooves of said table, and said cutting blade and said table being capable of movement relative to one another along the longitudinal axis of said



cutting blade so as to vary the length of blade in contact with said sheath.

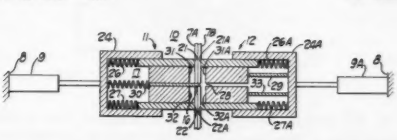
3,874,976
GRIPPER JAW ASSEMBLY

Raymond MacFarland, Jr., Novelty, Ohio, assignor to Computron, Inc., Valleyview, Ohio

Filed Feb. 2, 1973, Ser. No. 328,943

Int. Cl. B32b 31/00

U.S. Cl. 156—515 13 Claims



1. An apparatus for cutting and sealing a sealable material, comprising in combination:
a frame;
jaw means;
means for mounting said jaw means to said frame;
said jaw means including,
gripper means,
sealer means,
cutter means,
means for interconnecting said gripper and sealer and cutter means as a part of said jaw means;
means for moving said jaw means relative to said frame;
means for establishing relative movement between said gripper and sealer and cutter means to grip the material prior to cutting and sealing and to continue said grip subsequent to cutting and sealing the material,
and advancing means for moving said jaw means in a direction transverse to the direction of said means for relatively moving said gripper and sealer and cutter means to advance the material.

3,874,977
DECORATIVE GLASSWARE

Robert Phillip Pyles, Morgantown, W. Va., assignor to Houze Glass Corporation, Point Marion, Pa.

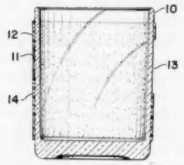
Filed May 19, 1969, Ser. No. 825,500

Int. Cl. B44f 1/00

U.S. Cl. 161—3 4 Claims

1. A hollow glass object and the like having an elongated cylindrical sidewall, a pair of separate designs imprinted around the circumference of said sidewall, one superposed on top of the other, one facing inwardly and the other outwardly and separated from one another by a neutral background and

an opening through both designs and the background forming an integral part of the outermost design through which a



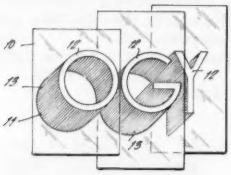
viewer may see through the glass sidewall to the innermost of the two designs on the opposite sidewall.

3,874,978

SHADOW LETTERING SYSTEM

Samuel Naiman, Queens, N.Y., assignor to Visual Graphics Corporation, New York, N.Y.

Filed Nov. 10, 1972, Ser. No. 305,527
Int. Cl. B44f *1/00, 7/00*
U.S. Cl. 161—6 **6 Claims**



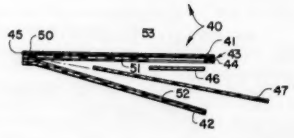
1. An indicia member for incorporation into a display, comprising a thin sheet of plastic material having opposite faces and capable of passing light therethrough, a coating of opaque material on portions of one face of the sheet defining indicia consisting of light areas and dark areas, and a coating of opaque material on the other face of the sheet at locations coinciding with the light areas, so that said sheets may be arranged into a display with individual sheets thereof in overlapping relationship with one another and the dark areas of the indicia on a subadjacent sheet are not visible through the light areas of the indicia on a superadjacent sheet.

3,874,979

IDENTIFICATION CARD PREFORM AND LAMINATING SYSTEM UTILIZING SAME

Donald F. Hannon, Willoughby, Ohio, assignor to Laminex, Inc., New York, N.Y.

Division of Ser. No. 168,082, Aug. 2, 1971, Pat. No. 3,770,553. This application Mar. 14, 1973, Ser. No. 341,325
Int. Cl. B32b *3/00*
U.S. Cl. 161—6 **11 Claims**



1. A preformed assembly for making an identification card which when sealed forms a laminated envelope structure encasing an insert, comprising:

a. a pair of transparent side flaps sandwiching an opaque core;

b. said side flaps being precut to a generally similar configuration and being positioned with the peripheral edges of one side flap in registry with the peripheral edges of the other side flap;

c. said core being precut to a size no greater than that of said side flaps and being positioned between said side flaps so as not to protrude beyond said peripheral edges;

d. said core being bonded to one of said side flaps so as to form an integral laminated assembly;

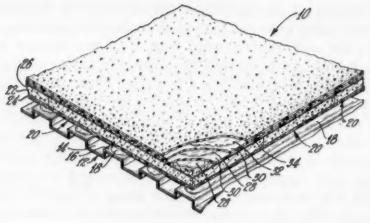
e. said core also being bonded to the other of said side flaps along only portions of the mating surfaces therebetween leaving the remaining mating surface portions freely separable so as to permit the insertion of an insert therebetween.

3,874,980

COMPOSITE FOAM PANEL WITH FIBROUS FACING SHEETS

David O. Richards, Newark; Isaac P. Jones, Granville; Homer W. Duffee, Newark, and Charles E. Nutter, Hebron, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed June 9, 1972, Ser. No. 263,746
Int. Cl. B32b *3/26*
U.S. Cl. 161—41 **11 Claims**



1. A composite panel comprising a core of a cellular, expanded material having two major substantially parallel surfaces and a peripheral edge of predetermined shape, a first layer of inorganic fibers on one of the major surfaces of the core with the layer being disposed substantially uniformly over the entire said one major surface, with portions of the cellular material at said one major surface penetrating interstices in the fibrous layer to cause the fibrous layer to be functionally integral with the core, the inorganic fibers in said first layer being randomly disposed in a thin mat in a plane generally parallel to said one major surface of said core, and a second layer of inorganic fibers on the other major surface of the core with the second fibrous layer being substantially uniformly disposed over the entire said other major surface of the core, with portions of the cellular material at said other major surface penetrating interstices in said second fibrous layer to cause the second layer to be functionally integral with the core, said first and second fibrous layers thereby substantially increasing the dimensional stability of the core, said second layer being a preformed, rigid board of glass fibers held together by a binder.

3,874,981

RESIN SHEET HAVING AN APPEARANCE OF CARPET OR VELVET AND PROCESS THEREFOR

Motoshige Hayashi, Tawaraguchi; Mikio Kukumura, and Zengo Sano, both of Nara, all of Japan, assignors to Sekisui Kaseihin Kogyo Kabushiki Kaisha, Nara-shi, Japan

Filed July 14, 1972, Ser. No. 271,689
Claims priority, application Japan, July 14, 1971, 46-52547
Int. Cl. B32b *5/18, 31/00*
U.S. Cl. 161—62 **6 Claims**

1. A resin sheet having an appearance of carpet or velvet which is prepared by splitting off an extruded foamed sheet of a resin along middle portions in the thickness direction thereof to form a surface having a great number of irregular projections standing upright to the surface, said resin being selected from the group consisting of polyolefin and polyamide, said extruded foamed sheet prior to splitting having substantially unfoamed front and back surface layers and a foamed intermediate layer therebetween, said intermediate layer having pores which are of gradually increasing size as the perpendicular distance from either surface approaches the center of said intermediate layer, said pores being increasingly elongated in shape in said perpendicular direction as the distance from either surface approaches the center of said intermediate layer, said pores at the center being ruptured and communicated with each other and the walls of the pores being dispersed in the form of thin films oriented in said perpendicular direction; the extruded sheet thus having a structure such that half portions, front and back, are partly connected to each other by bridges of said thin films, so that the sheet has no permeability in the direction of the thickness, but a considerable permeability in a lateral direction such as to permit more than 15 g of methanol to pass through the sheet per square centimeter thereof in ten minutes.

3,874,982

TIRE CONSTRUCTION WITH IMPROVED REINFORCEMENT

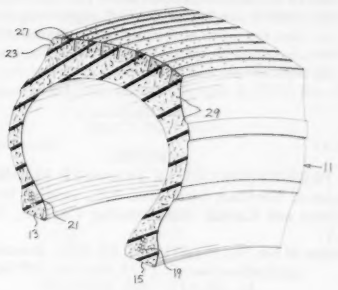
Alfred Marzocchi, Cumberland, and Alfred Winsor Brown, Woonsocket, both of R.I., assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Division of Ser. No. 882,770, Dec. 19, 1969, Pat. No. 3,658,108, and a continuation of Ser. No. 699,193, Jan. 19, 1968, abandoned, which is a continuation-in-part of Ser. No. 622,588, March 13, 1967, Pat. No. 3,433,689, which is a division of Ser. No. 450,790, April 26, 1965, Pat. No. 3,315,772. This application Aug. 31, 1971, Ser. No. 176,463
Int. Cl. B29h *9/04;* **B32b**
U.S. Cl. 161—93 **1 Claim**

1. A vulcanizable structure comprising:

an elastomeric matrix and

a plurality of elongate, mutually parallel cords of an organic material disposed within said matrix, said elastomeric matrix also including, in proximate and surrounding relationship with said parallel cords, a plurality of discrete individual filaments of glass ranging up to about ¼ inch in length and a plurality of chopped glass cords ranging from about ⅛ inch to about 3 inches in length, said glass



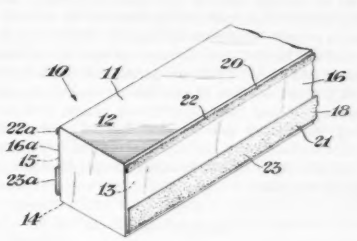
cords comprising essentially a plurality of glass filaments held in juxtaposition by an elastomeric impregnant.

3,874,983

LAMINATE CONSTRUCTION

Robert A. Hay, II., and John A. De Bliek, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 17, 1973, Ser. No. 425,490
Int. Cl. B32b *3/04*
U.S. Cl. 161—102 **7 Claims**



1. In a process for the preparation of a structure wherein a foam plastic/metal laminate body is provided, the body having an elongate generally rectangular configuration and a metal layer adhered to at least one surface, the metal laminate having at least a first edge and a second edge wherein the second edge of the metal is not adhered to the foam but is folded back upon itself, the elongate foam/metal laminate body being applied to a generally like foam/metal laminate body wherein the second edge of the metal layer is disposed adjacent the first edge of the previously deposited metal layer of a foam plastic/metal laminate and the portion of the second edge of the metal layer unfolded and joined to the adjacent metal layer in the region of the first edge of the adjacent metal layer, the improvement which comprises

folding a portion of the first edge of the layer of the laminate about 180° in a direction away from the foam portion of the foam plastic/metal laminate, the fold in the first edge being substantially narrower than that in the second edge.

5. An improved foam/metal laminate suitable for the preparation of walled structures, the foam/metal laminate comprising a generally rectangular elongate foam plastic body having a generally rectangular cross-sectional configuration, a metal layer comprising a metal sheet having on one surface thereof an adhesive, a major portion of the adhesive adhered to one face of the foam plastic member, the elongate metal strip having a first edge and a second edge, the first and second edges of the metal sheet ex-

tending in the direction of the major dimension of the elongate body, each of the edges being folded about 180° inwardly, thereby disposing remote from the foam a portion of the adhesive adjacent the first and second edges, the width of the fold at the first edge being substantially less than the width of the fold at the second edge and the total width of the metal being greater than the width of the adjacent portion of the foam body.

3,874,984

PRESSURE-SENSITIVE TRANSFER ELEMENTS

Douglas A. Newman, Glen Cove, N.Y., assignor to Columbia Ribbon and Carbon Manufacturing Co., Inc., Glen Cove, N.Y.

Division of Ser. No. 167,471, July 29, 1971, abandoned. This application Mar. 5, 1973, Ser. No. 337,942

Int. Cl. B41c *1/06;* **B32b** *3/04*

U.S. Cl. 161—117 **7 Claims**

1. An assembly comprising a pressure-sensitive transfer sheet and a copy sheet united to each other along one edge to form a unit, said transfer sheet having a flexible plastic film foundation having improved anti-static properties and having the opacity and cutting and punching properties of paper, comprising a thin biaxially-oriented plastic film which is oriented in one direction to at least about 1.5 times its original dimension, and is oriented in the other direction to at least about 2 times its original dimension, a thin monoaxially oriented surface layer bonded to at least one surface of said film, said layer comprising a synthetic thermoplastic resin and from about 5 to 50 percent by weight of a solid particulate filler having an average particle size between about 5 and 25 microns, said surface layer being stretched to at least about 2 times its original dimension to cause the filler to break through the surface thereof and form a multiplicity of fine cracks thereon, and having a pressure-sensitive transfer layer bonded to the cracked surface of said surface layer, said copy sheet consisting of said biaxially-oriented plastic film foundation having bonded to one surface thereof said monoaxially-oriented surface layer, said layer facing and being receptive to the transfer layer of said transfer sheet under the effects of imaging pressure.

3,874,985

STRAPPING FORMED BY BONDING CO-EXTENDING FILAMENTS WITH A POLYMERIC COMPOSITION

Thomas John Karass, 411 Kindersley Ave., Mount Royal, Quebec, Canada

Filed Dec. 11, 1973, Ser. No. 423,731

Int. Cl. D04h *3/02, 3/12*

U.S. Cl. 161—143 **10 Claims**

1. A method of forming a weftless tape consisting of coating a plurality of flexible strands made of yarns selected from nylon, fibreglass and polyester, with a liquid mixture containing a plasticizer selected from dibutyl phthalate and di-ethylene glycol di-benzolate, a copolymer of vinyl acetate and ethylene and a copolymer of vinyl acetate and dibutyl maleate, bringing said strands together in parallel relationship on substantially the same plane and drying the formed tape.

7. A weftless high strength packaging tape consisting essentially of twisted strands of continuous filaments of a material selected from nylon, fiberglass and polyester, said strands arranged in close parallel relationship and a binder material coating and adhering said strands one to another and comprising a mixture of first copolymer of vinyl acetate and ethylene and of a second copolymer of vinyl acetate and dibutyl maleate mixed together in a proportion of 2 to 4 parts of the first polymer per part by weight of the second copolymer, said binder material further including a plasticizer selected from dibutyl phthalate and di-ethylene glycol di-benzolate.

3,874,986

LAMINATED POROUS/NON-POROUS MEMBRANES

Warella R. Browall, Scotia, and Robert M. Salemme, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 20, 1974, Ser. No. 471,320

Int. Cl. B32b *3/26, 27/28*

U.S. Cl. 161—160 **3 Claims**

1. A composite containing unified layers of polymer consisting of a non-porous layer of polyphenyleneoxide/organopolysiloxane-polycarbonate copolymer, a backing layer of a material selected from the group consisting of microporous polyvinyl chloride-acrylonitrile copolymer and microporous polycarbonate and an intermediate layer of organopolysiloxane-polycarbonate copolymer adhering said non-porous layer to said backing layer.

3,874,987

LAMINATE OF A MOISTURE IMPERVIOUS POLYETHYLENE FOAM AND A SUSPENSION CHLORINATED POLYETHYLENE SHEET

Warren L. Young, Baton Rouge, La., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 13, 1974, Ser. No. 450,628

Int. Cl. B32b *3/26*

U.S. Cl. 161—160 **3 Claims**

1. A laminate structure consisting essentially of (A) a substantially moisture impervious polyethylene foam underlayer in combination with (B) a covering layer of a sheet of chlorinated ethylene polymer prepared by the suspension chlorination of an ethylene polymer having an essentially linear structure, said ethylene polymer being selected from the group consisting of polyethylene and interpolymers composed of at least about 90 mole percent ethylene with any remainder being at least one ethylenically unsaturated comonomer wherein said ethylene polymer is first chlorinated at a temperature below its agglomeration temperature up to a chlorine content of from about 2 to 23 percent chlorine based on the weight of said ethylene polymer, followed by the sequential suspension chlorination of such polymer in a particulate form at a temperature above its agglomeration temperature but at least about 2°C below its crystalline melting point and wherein the chlorination product is characterized by regions in which a minor portion of the chlorine atoms along the polymer chain are distributed in a non-statistical block type fashion while the remainder of the polymer is chlorinated in a random manner characteristic of chlorination products obtained by solution chlorination techniques; said chlorinated ethylene polymer containing from about 35 to about 50 weight percent of chemically combined chlorine and having a relative crystallinity of less than about 10 percent; said sheet having a thickness of at least about 0.01 of an inch, a tensile strength of at least about 1000 pounds per square inch, an elongation of between about 200 and 1000 percent and a 100 percent modulus of between about 150 and 300 pounds per square inch.

3,874,988

MANUFACTURE OF EXPANDED CELLULAR PRODUCTS

Fred Buff, 59 Wyoming Rd., Paramus, N.J. 07652; Marcus French, 160 S. Church St., Hazelton, Pa. 18709, and Warren Pollock, Orchard Ln., Conyngham, Pa. 18709

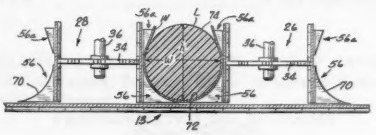
Continuation of Ser. No. 101,413, Dec. 24, 1970, abandoned, which is a continuation of Ser. No. 695,289, Jan. 2, 1968, abandoned, which is a continuation-in-part of Ser. No. 525,783, Nov. 15, 1965, abandoned, which is a division of Ser. No. 401,190, Oct. 2, 1964, Pat. No. 3,281,894, which is a continuation-in-part of Ser. No. 333,479, Dec. 26, 1963, Pat. No. 3,296,658. This application Dec. 3, 1973, Ser. No. 418,761

Int. Cl. B32b *3/26*

U.S. Cl. 161—165 **2 Claims**

1. An article of manufacture suitable for peeling with a knife to form a thin continuous sheet of flexible polyurethane foam material by being rotated against a knife blade, said

article comprising a cast, elongated, cylindrical element of generally circular cross-section formed exclusively of foamed



resilient polyurethane material, said cylindrical element having a diameter in excess of about two feet and a continuous and uninterrupted, substantially uniform cross section.

3,874,989

COMPOSITE FILM AND SHEETING

Karl Stange, Neustadt; Alfred Hofmann, Bobenheim-Roxheim, and Hans-Peter Weiss, Altrip, all of Germany, assignors to Badische Anilin & Soda Fabrik Aktiengesellschaft, Ludwigshafen, Germany

Filed Dec. 18, 1972, Ser. No. 316,228

Claims priority, application Germany, Dec. 24, 1971, 2164461

Int. Cl. B32b *27/40, 15/08, 27/08*

U.S. Cl. 161—190 **5 Claims**

1. A composite film or sheeting comprising (a) at least one ply (A) consisting of polybutylene terephthalate: (b) at least one ply (B) bonded to said ply (A) of a member selected from the group consisting of polyethylene of a density of from 0.92 to 0.96 g/ccm, polypropylene, ethylene/vinyl acetate copolymers, polystyrene, polyamides, polymers based on cellulose and cellulose acetate, polyvinyl chloride, aluminum, copper, lead and steel, and (c) at least one ply (C) of a hot melt adhesive bonding ply (B) to ply (A) selected from the group consisting of ethylene and urethane based polymers containing polar groups.

3,874,990

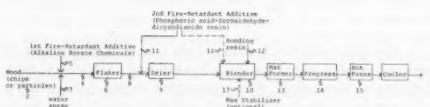
FLAME-RETARDANT PARTICLE-BOARD AND PROCESS FOR MAKING SAME

Lyle V. Surdyk, Chester, Calif., assignor to Collins Pine Company, Portland, Oreg.

Filed June 13, 1973, Ser. No. 369,770

Int. Cl. B32b *5/16, 21/02*

U.S. Cl. 161—261 **4 Claims**



1. A process for manufacturing fire-retardant composite wood products comprising: forming comminuted wood particles; diffusing into said wood particles a fire-retardant alkaline borate chemical; adding to said wood particles a formaldehyde resin formed from formaldehyde, dicyandiamide, phosphoric acid and a reactant selected from the group consisting of urea and melamine; blending a curable bonding resin with said wood particles; and compressing said wood particles with sufficient pressure and temperature to cure the bonding resin to form a composite wood product.

3,874,991

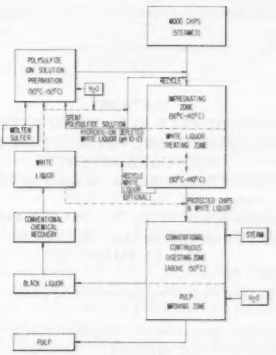
POLYSULFIDE IMPREGNATION OF LIGNOCELLULOSIC MATERIALS IN A CONTINUOUS DIGESTER

Peder J. Kleppe, Jeloy, Norway, assignor to Westvaco Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 754,893, Aug. 23, 1968, abandoned, and a continuation of Ser. No. 96,164, Dec. 8, 1970, abandoned. This application Feb. 2, 1973, Ser. No. 328,974

Int. Cl. D21c *3/26*

U.S. Cl. 162—19 **4 Claims**



1. A process for increasing the pulp yield of continuously digested lignocellulosic materials consisting of:

a. impregnating said lignocellulosic materials with an aqueous solution containing polysulfide ions at a temperature between 90°C. and 140°C. at an ambient pH between 11 and 13,

b. withdrawing the excess polysulfide ion-containing solution,

c. treating said impregnated lignocellulosic material with a solution containing hydroxyl ions whereby the aldehyde end groups of the lignocellulosic materials are oxidized carbonyl groups which are protected against alkaline degradation,

d. withdrawing at least a portion of said solution containing hydroxyl ions, said solution being at a pH between 10 and 12,

e. preparing said aqueous polysulfide ion-containing solution for use in step (a) from a base solution, said base solution comprising a combination of the withdrawn excess polysulfide ion-containing solution and the withdrawn hydroxyl ion-containing solution by admixing thereto from 0.5% to 2.9% molten sulfur at a temperature between 90°C. and 140°C. and then,

f. digesting said hydroxyl ion treated impregnated lignocellulosic material in a conventional sulfate cook.

3,874,992

PRESS ALKALINE EXTRACTION OF CELLULOSIC PULP

Norman Liebergott, Laval, Quebec, Canada, assignor to Pulp and Paper Research Institute of Canada, Quebec, Canada

Filed Sept. 20, 1973, Ser. No. 399,331

Claims priority, application Canada, Sept. 29, 1972, 152905

Int. Cl. D21c *9/14*

U.S. Cl. 162—66 **20 Claims**

1. An improved alkaline extraction procedure in the manufacture of paper-making pulp, which comprises:

a. mixing a pretreated paper-making grade of pulp, having been pretreated with a bleaching chemical and then washed, at a consistency of up to about 12% with an aqueous solution of an alkali of a concentration of 0.5 –

5% based on the pulp and at a temperature of about 40° to about 90°C., and then without an intervening washing step;

b. substantially immediately thereafter subjecting said mixture to a rapid press extraction, during which no substantial washing occurs, for a sufficient time and under a sufficient pressure to obtain a consistency of about 18% to about 40%, the total treatment time of steps (a) and (b) being for a time sufficient to obtain a resultant extracted pulp containing less than 91% α-cellulose, and retaining a substantial quantity of hemi-celluloses, a substantial degree of the extraction being accomplished in said rapid press extraction.

3,874,993

GROUNDWOOD PULP BLEACHING WITH SODIUM HYDROSULFITE IN THE PRESENCE OF BENZENE POLYCARBOXYLATES

Leonard C. Ellis, Chesapeake, Va., assignor to Virginia Chemicals Inc., Portsmouth, Va.

Continuation-in-part of Ser. No. 295,422, Oct. 6, 1972, abandoned. This application Mar. 18, 1974, Ser. No. 452,132

Int. Cl. D21c *9/10*

U.S. Cl. 162—71 **15 Claims**

1. A method of bleaching groundwood pulp comprising the steps of:

A. preparing a groundwood pulp slurry at a consistency of less than 5.0% and agitating said slurry;

B. adding to the pulp slurry a chelating agent consisting of an alkali metal salt of benzene polycarboxylic acid in an amount of 0.1 to 10.0 lbs. per ton of pulp;

C. combining with the slurry a bleach water solution comprising sodium hydrosulfite in an amount of 3.0 to 50.0 lbs. per ton of pulp and;

D. maintaining the pH of the pulp slurry at 4.1 to 6.3 and the temperature thereof at 90°F. – 170°F.

3,874,994

PROCESS OF MAKING PAPER WHERE AN IONIC VINYLAMIDE POLYMER LATEX IS ADDED TO THE FURNISH TO IMPROVE DRY STRENGTH OF THE PAPER

John Andrew Sedlak, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 211,624, Nov. 23, 1971. This application Apr. 18, 1974, Ser. No. 461,818

Int. Cl. D21h *3/02, 3/38*

U.S. Cl. 162—163 **7 Claims**

1. A process for the manufacture of paper of improved dry strength which comprises forming an aqueous suspension of cellulose papermaking fibers having a pH between 4 and 8, adding thereto a polymer latex in amount sufficient to provide from about 0.01% to 5% of polymer based on the dry weight of the fibers, forming said fibers into a web, and dryins said web; the polymer of said latex consisting essentially of at least 60 weight percent of unsubstituted acrylamide linkages as dry strengthening components, and at least about 5 weight percent of hydrophobic vinyl linkages and at least about 2 weight percent of N-[di(C_{1-3} alkyl)aminomethyl]acrylamide linkages as components improving the adsorptivity of said polymer by cellulose fibers in aqueous suspension, said polymer containing up to about 10 weight percent of anionic linkages, the ratio among said linkages being such that the polymer is insoluble in water but is substantially autodispersible in water forming a non-creaming dispersion therein, said latex at 10% by weight polymer solids content, pH 9.5 and 25°C. having a viscosity between about 250 and 200,000 centipoises.

3,874,995

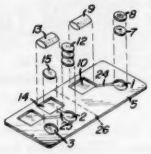
METHOD OF MAKING ALUMINIZED PAPER

Howard L. Stroterhoff, Baltimore, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 129,360, March 30, 1971, Pat. No. 3,740,196. This application June 18, 1973, Ser. No. 371,087

Int. Cl. D21h *3/66*

U.S. Cl. 162—181 R **2 Claims**



1. A method of producing aluminized paper for use in an apparatus to detect environment toxic agent contamination comprising the steps of: mixing the following ingredients in the approximate ratio of 3.0 grams blotting paper, 9.0 grams aluminum powder, and 2,000 ml of water at high speed in a blender for approximately 3 minutes to separate the fibers and produce a slurry; pouring the slurry into a paper mold; draining the water from the slurry within the paper mold to produce an aluminum paper mat; removing the aluminum paper mat from the paper mold; drying the paper mat in an oven at approximately 90°C for approximately 2 hours; and cutting the paper mat into predetermined sizes to use in the apparatus.

3,874,996

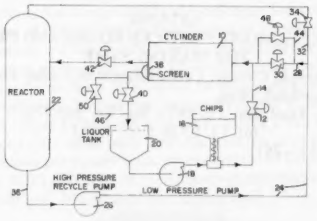
CHIP FEEDER FOR HIGH PRESSURE PULPING SYSTEM

Louis A. Pradi, Wausau, Wis., assignor to Sterling Drug Inc., New York, N.Y.

Filed Apr. 2, 1973, Ser. No. 347,152

Int. Cl. D21c *7/06*

U.S. Cl. 162—246 **10 Claims**



1. An apparatus for feeding chips into a high pressure system comprising a holding tank for holding chip slurry, means defining a chip supply, first connecting means connecting the chip supply to the holding tank, a liquor supply tank, second connecting means connecting the liquor supply tank to the chip supply and thereby to the holding tank, low pressure means located between the liquor tank and chip supply means for charging the holding tank with chip slurry through said first connecting means, valves between the holding tank and liquor supply tank and between the chip supply and holding tank for cutting off the low pressure means with respect to said holding tank,

a high pressure system including the holding tank and a reactor, a valve on either side of said holding tank for cutting off the high pressure system with respect to the holding tank, said valves when open however directing high pressure at one end of the tank forcing the contents

out of the other end of the tank through lines leading the slurry in the tank into the reactor,

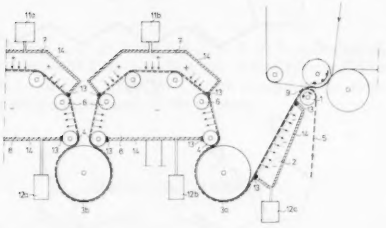
and bypassing valves for the valve at the incoming end of the holding tank and the valve between the holding tank and liquor supply tank to pressurize the holding tank or depressurize it prior to operation, the bypassing valves equalizing the pressure across the valves bypassed.

3,874,997

MULTIPLE CYLINDER DRIER IN A PAPER MACHINE

Matti Kankaanpaa, Tapiola, Finland, assignor to Valmet Oy, Helsinki, Finland

Filed Mar. 21, 1973, Ser. No. 343,469
Int. Cl. F26b *13/08*
U.S. Cl. 162—290 **4 Claims**



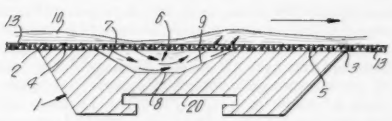
1. In a paper machine, a dryer assembly for the drying of a paper web, comprising a row of drying cylinders rotatable about their horizontal axes; perfusion drying means disposed at a vertical distance from the row of drying cylinders and located between said drying cylinders in their interstices; a drying wire permeable to air, the paper web traveling in contact with and supported by said wire from the beginning to the end of the dryer assembly all the way zigzagging from the preceding drying cylinder to the next perfusion drying means, the paper web being disposed on that side of the drying wire where, when running upon a drying cylinder, the paper web is interposed between the drying wire and the mantle surface of the drying cylinder so that hereby, the drying of the paper web by contact drying takes place; said perfusion drying means further comprising, on the side facing the drying wire and adjacent to it, a hot air blowing hood, and on the other side of the drying wire and paper web opposite thereto, a suction chamber extending and limited to the entire joint run of web and wire from one drying cylinder to the next, so that perfusion drying of the paper web takes place substantially on the whole distance of travel of the paper web from the preceding to the next drying cylinder, and so that drying furthermore takes place by impingement drying in the region of the blowing hood; a suction roll at the beginning of the dryer assembly and at a vertical distance from the first drying cylinder so that, by means of said suction roll, the paper web is transferred to be supported by the drying wire; a joint run of the paper web and drying wire between said suction roll and first drying cylinder; a suction box on said joint run on the side facing the drying wire, the effect of the vacuum in this suction box being used to make the paper web adhere to the drying wire.

3,874,998

AGITATOR BLADE FOR USE BELOW FORMING WIRE OF PAPER MAKING MACHINE

Dale Bernard Johnson, Pointe Claire, Quebec, Canada, assignor to JWI Ltd., Quebec, Canada

Filed July 23, 1973, Ser. No. 381,557
Claims priority, application United Kingdom, July 26, 1973, 34855/73
Int. Cl. D21f *1/00, 7/00*
U.S. Cl. 162—308 **16 Claims**



1. An attachable-detachable agitating device for placing in supporting relationship to the forming wire of a paper making machine and extending thereacross transversely of the direction of wire travel, comprising,

a blade having a relatively narrow elongated thin body provided with a top face, a bottom, and free upstream and free downstream faces,

the body being provided with a keying slot entering at the bottom and extending the length of the body for sildably receiving a complementary shaped key support member of the paper machine,

the top face being provided with an upstream support surface terminating in an upstream edge where the wire first encounters the blade, a downstream support surface terminating in a downstream edge where the wire leaves the blade and an intermediate surface extending downwardly from the upstream support surface and upwardly to the downstream support surface to provide an agitating channel for drawing water from and forcibly returning it to the stock.

3,874,999

PROCESS FOR THE PURIFICATION OF VIRUS VACCINE

Edmund Anthony Zaremba, and Francis Robert Cano, both of Spring Valley, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Oct. 31, 1973, Ser. No. 411,564
Int. Cl. C12k *7/00*
U.S. Cl. 195—1.5 **3 Claims**

1. In a process for removing non-viral proteinaceous and lipid materials from an impure, egg grown virus preparation, the improvement which consists of treating the phosphate buffered viral suspension with about **0.1** to about **0.4** molar solution of magnesium sulfate at a pH of about **8.0** to about **9.0** at about **4**°C. for about **16–72** hours; and removing the salt precipitated protein impurities by low-speed centrifugation.

3,875,000

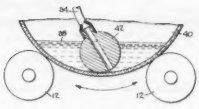
CELL CULTURE APPARATUS

Ben Kaneda, Norristown, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Apr. 5, 1974, Ser. No. 458,425
Int. Cl. C12b *1/00*
U.S. Cl. 195—1.7 **9 Claims**

1. Tissue culture apparatus comprising a tissue culture bottle, support and drive means supporting said bottle with its longitudinal axis horizontal, said support and drive means being operative to rotate said bottle about its longitudinal axis reciprocally first in one direction and then in the opposite direction, fluid conduit means for effecting transfer of fluids between the interior of the bottle and an exterior manifold during rotation of said bottle, said fluid conduit means comprising at least one flexible tube extending between one end

of said bottle and said manifold, said flexible tube being fixedly secured at each end, respectively, to said bottle and to



said manifold, said tube being twistable while remaining open, over the rotational movement of said bottle.

3,875,001

FERMENTATIVE PRODUCTION OF L-HISTIDINE

Koji Kubota; Hirotaka Kamijo; Osamu Mihara, all of Kawasaki; Shinji Okumura, and Hiroshi Okada, both of Tokyo, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Aug. 20, 1973, Ser. No. 389,790
Claims priority, application Japan, Aug. 25, 1972, 47-85715
Int. Cl. C12d *13/06*
U.S. Cl. 195—29 **4 Claims**

1. A method of producing L-histidine which comprises

a. culturing a strain of Brevibacterium or Corynebacterium under aerobic conditions in an aqueous medium containing sources of assimilable carbon and nitrogen and minor amounts of inorganic salts and organic nutrients necessary for the growth of said strain until histidine accumulates in said medium,

1. said strain being an artificially induced mutant capable of growing on a medium containing more than 1 mg 2-thiazole alanine per milliliter, and requiring for growth at least one organic nutrient selected from the group consisting of arginine, methionine, tryptophane, leucine, phenylalanine, lysine, threonine, uracil, xanthine, and shikimic acid; and

b. recovering the accumulated histidine from said medium.

3,875,002

HIGHLY SPECIFIC TUBERCULIN

Silvio Landi, Islington, Ontario, and Krishana Chandara Gupta, Willowdale, Ontario, both of Canada, assignors to Connaught Laboratories Limited, Willowdale, Ontario, Canada

Filed Jan. 14, 1974, Ser. No. 433,138
Int. Cl. C12d *7/00*
U.S. Cl. 195—29 **11 Claims**

1. A process for the preparation of a purified highly specific tuberculin peptide substantially free of protein comprising hydrolyzing a tuberculin PPD with an alkaline active proteolytic enzyme, removing protein from the resultant hydrolysate and recovering a first peptide fraction from the remaining hydrolysate by separation with an ion-exchange resin at about pH3.

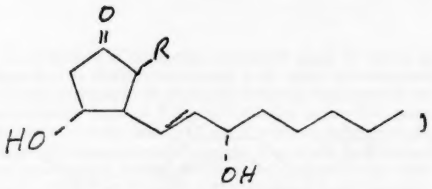
3,875,003

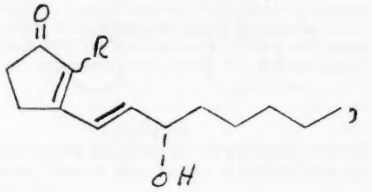
PROCESS FOR THE PREPARATION OF PROSTAGLANDIN

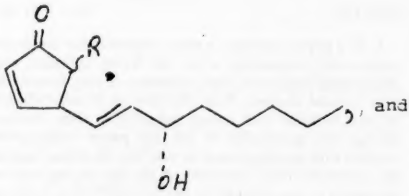
Istvan Stadler, Gabor Kovacs, Zoltan Meszaros, Julia Radoczi, Vilmos Simonidesz, Istvan Szekely, and Csaba Szathmary, all of Budapest, Hungary, assignors to Chinoin Pharmaceutical and Chemical Works Ltd., Budapest, Hungary

Filed Sept. 11, 1972, Ser. No. 288,091
Claims priority, application Hungary, Sept. 28, 1971, CI-1167
Int. Cl. C12d *1/02*
U.S. Cl. 195—30 **4 Claims**

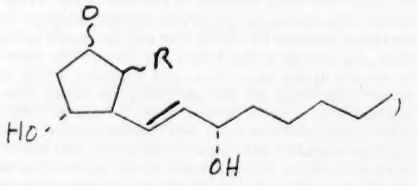
1. A process for producing a prostaglandin, comprising hydrolyzing an ester selected from the group which consists of:







and



wherein R is $-(CH_2)_6-COOR_1$ or $-CH_2-(CH=CH)-(CH_2)_3-COOR_1$ in α or β steric position and R_1 is alkyl having 1 to 4 carbon atoms, at a pH between 6 and 8.5 with an ester hydrolase enzyme (EC.3.1.13) selected from the group which consists of lipase SAIKEN A of 30 to 35 Desnuelle units specific activity and pancreas lipase of 25 Desnuelle units specific activity, and recovering the resulting prostaglandin acids.

3,875,004
ENZYMATIC PROCESS FOR PRODUCING PROSTAGLANDINS C

Robert L. Jones, Edinburgh, Scotland, assignor to The University Court of The University of Edinburgh, Edinburgh, Scotland

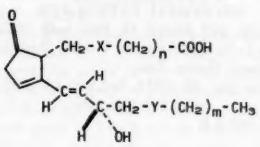
Division of Ser. No. 345,347, March 27, 1973,. This application June 26, 1974, Ser. No. 483,468

Claims priority, application United Kingdom, Mar. 28, 1973, 14520/73; May 17, 1972, 23135/72

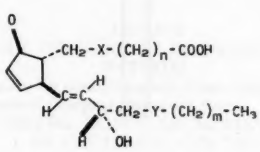
Int. Cl. C12d *1/02*

U.S. Cl. 195—30 **5 Claims**

1. A process for producing an optically active product of the formula:



wherein *m* is 0, 1, 2, or 3 and *n* is 2, 3, 4, or 5, and wherein X and Y are $-CH_2CH_2-$ or X is cis—CH=CH— and Y is $-CH_2CH_2-$ or cis —CH=CH—, which comprises the steps (a) incubating a compound of the formula:



with the prostaglandin A isomerase enzyme of mammalian blood plasma at a pH about 7, and (b), isolating said product from the resulting incubation reaction mixture.

3,875,005
THROMBOLYTIC AND FIBRINOLYTIC ENZYME FROM STREPTOMYCES

Andre Belloc, Vanves; Jean Florent; Jean Lunel, both of Paris; Denise Mancy, Charenton, and Jean Verrier, Boulogne-sur-Seine, all of France, assignors to Rhone-Poulenc S.A., Paris, France

Filed July 25, 1972, Ser. No. 275,091

Claims priority, application France, July 27, 1971, 71.27449; June 12, 1972, 72.21092

Int. Cl. C07g *7/02, 7/028*

U.S. Cl. 195—62 **10 Claims**

1. A proteolytic enzyme which is thrombolytic and fibrinolytic and produced by *streptomyces venetus* DS 24,288 (NRRL 3987), or a mutant thereof capable of producing the said enzyme, which enzyme has the following characteristics: it is a white powder which is very soluble in water, soluble in aqueous-alcoholic and aqueous-acetone mixtures, very sparingly soluble in concentrated solutions of neutral salts or of polyethylene glycol and insoluble in anhydrous alcohols, acetone, hexane, ethyl acetate, diethyl ether and chlorinated solvents; it is a protein containing carbon, hydrogen, oxygen, nitrogen and sulphur, the elementary composition of which is approximately C=50.4%, H=7.35%, N=17% and S=0.50%; its specific optical rotation is $[\alpha]_D^{20} = -14° \pm 0.5°$, $[\alpha]_{436}^{20} = -29.2° \pm 0.6°$, $[\alpha]_{365}^{20} = -53.5° \pm 0.8°$, (C=0.02; water); its ultra-violet spectrum (aqueous solution) shows absorptions at 210 nm ($E_{1cm}^{1\%} = 187$), 250 nm ($E_{1cm}^{1\%} = 4.35$) and 278 nm ($E_{1cm}^{1\%} = 13.55$); its infra-red spectrum (determined with tablets of a mixture with potassium bromide) shows principal absorption bands as follows: 3,280 very strong, 3,200 shoulder, 3,060 medium, 3,040 very weak, 2,980 shoulder, 2,960 medium, 2,935 weak, 2,880 shoulder, 2,650 shoulder, 1,650 very strong, 1,535 very strong, 1,515 medium, 1,490 shoulder, 1,465 very weak, 1,455 very weak, 1,445 medium, 1,435 shoulder, 1,418 shoulder, 1,405 weak, 1,398 shoulder, 1,385 medium, 1,375 shoulder, 1,365 shoulder, 1,330 very weak, 1,303 weak, 1,280 shoulder, 1,235 medium, 1,165 weak, 1,145 very weak, 1,110 medium, 1,075 medium, 1,055 very weak, 1,040 very weak, 927 very weak, 920 very weak, 825 very weak, 735 very weak, 695 weak, about 600 medium and wide 530 weak, 470 shoulder, 430 weak; its molecular weight, as determined by its chromatographic behaviour on a dextran or polyacrylamide gel, is 40,000 ± 5,000, and acid hydrolysis demonstrates the presence of the following amino acids, for which the content is millimol per 10 g. of product is given: aspartic acid (11.5), threonine (8.5), serine (7), glutamic acid (3.5), proline (2.5), glycine (13), alanine (7), valine (4.5), methionine (1), isoleucine (2.5), leucine (4), tyrosine (5), phenylalanine (2), lysine (3), arginine (2.5) and histidine (2).

3,875,006
PROTEOLYTIC ENZYME FROM STREPTOMYCES HYGROSCOPICUS

Andre Belloc, Vanves; Jean Florent, Paris; Denise Mancy, Charenton, and Jean Verrier, Boulogne sur Seine, all of France, assignors to Rhone-Poulenc S.A., Paris, France

Filed Aug. 10, 1972, Ser. No. 279,299

Claims priority, application France, Aug. 12, 1971, 71.29581

Int. Cl. C07g *7/028;* **A21d** *13/00*

U.S. Cl. 195—62 **7 Claims**

1. A proteolytic enzyme useful for the manufacture of baked goods, produced by *Streptomyces hygroscopicus* DS 14649 (NRRL 3999), which is a protein very soluble in water, sparingly soluble in concentrated solutions of neutral salts and in aqueous alcoholic or aqueous-acetone mixtures, and insoluble in anhydrous alcohols and ketones, which shows a maximum proteolytic activity on casein at 25°–30°C. and at pH 6.8, and retains at least 50% of this activity between pH 5.5 and 7.0.

3,875,007
LIPID METABOLISM IMPROVING AND ANTI-ATHEROMATIC AGENT

Mizuho Kobayashi, Gifu, Japan, assignor to Amano Pharmaceutical Co., Ltd., Nagoya, Japan

Continuation-in-part of Ser. No. 303,312, Nov. 3, 1972, abandoned. This application Feb. 6, 1973, Ser. No. 329,981

Int. Cl. C12d *13/10*

U.S. Cl. 195—62 **6 Claims**

1. Lipolytic substance GA-56 capable of specifically hydrolyzing chylomicron and low-density lipoprotein and having high intestinal absorbability, said lipolytic substance GA-56 having the following properties (1) it acts specifically on natural fat and oil, chylomicron and low-density lipoprotein to decompose them, (2) optimum pH range is from 7 to 11, (3) optimum temperature is between 40° and 50°C, (4) it suffers no inactivation in 60-minute treatment at 37°C and at pH 4, (5) it suffers substantially little inactivation in the presence of inorganic salts, (6) it is completely free of sugar, (7) its molecular weight is approximately 30,000, (8) its mobility as measured by paper electrophoresis is 153×10^{-5} cm^2, sec^{-1}, v^{-1} (pH=8.7, μ=0.05), (9) its ultra-violet absorption spectrum is as shown in FIG. **2**, (10) its infrared absorption spectrum is as shown in FIG. **1**, and (11) its elementary analysis gives C: 45.72%, H: 6.85%, O: 26.05%, N: 14.38%, S: 0.34%.

3,875,008

HOLLOW FILAMENT CONTAINING ENZYMES AND/OR MICROORGANISMS

Masatsugu Yoshino, Tokyo; Yasuo Hashino, Matsudo, and Masataka Morishita, Shizuoka, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed July 31, 1973, Ser. No. 384,385

Claims priority, application Japan, Aug. 4, 1972, 47-77680

Int. Cl. C07g *7/02;* **C12k** *1/00*

U.S. Cl. 195—63 **4 Claims**

1. A hollow filament encapsulating therein a solution or dispersion of an enzyme, a microorganism or both, said hollow filament comprising wall material of a semipermeable gel of a polymer selected from the group consisting of polyacrylonitrile, polymethacrylonitrile, cellulose acetate, cellulose acetate phthalate, hydroxypropyl methyl cellulose phthalate, hydroxypropyl methyl cellulose trimellitate, vinyl chloride-vinyl acetate copolymer, polyurethane, polysulfone and copolymers containing these polymer components, said wall material having a water permeability of at least 0.1 $ml/cm^2.min.atm.$, and said filament having an external diameter of from about 0.1 mm to about 1.5 mm and an inside diameter of from about 0.06 mm to about 1.3 mm.

3,875,009

BIOLOGICAL PRODUCTS

Kenneth Trevor Glasziou, Indooroopilly, Queensland, Australia, and Charles Roger Slack, Edinburgh, Scotland, assignors to The Colonial Sugar Refining Company Limited, Sydney, New South Wales, Australia

Filed July 20, 1973, Ser. No. 381,171

Claims priority, application Australia, July 28, 1972, 9884/72

Int. Cl. C12d *13/10*

U.S. Cl. 195—65 **34 Claims**

1. A method of producing dextranase comprising culturing a dextranase-producing strain of the fungus *Fusarium fusarioides*, or a mutant or variant of said dextranase-producing strain, in a fermentation medium, and recovering the dextranase which accumulates therein.

3,875,010

PROCESS FOR THE PREPARATION OF DAUNORUBICIN

Denise Mancy, Val-de-Marne; Jean Florent, and Jean Preud'-Homme, both of Paris, all of France, assignors to Rhone-Poulenc S.A., Paris, France

Filed Nov. 17, 1969, Ser. No. 877,511

Claims priority, application France, Nov. 18, 1968, 68.174206

Int. Cl. C12d *9/00*

U.S. Cl. 195—80 R **5 Claims**

1. Process for the production of daunorubicin which comprises aerobically cultivating *Streptomyces bifurcus*, strain DS 23,219 (NRRL 3539), or a daunorubicin-producing mutant thereof, using an aqueous nutrient medium containing assimilable sources of carbon, nitrogen and inorganic substances, and separating daunorubicin formed during the culture.

3,875,011

ENZYME IMMUNOASSAYS WITH GLUCOSE-6-PHOSPHATE DEHYDROGENASE

Kenneth Edward Rubenstein, Palo Alto, and Edwin F. Ullman, Atherton, both of Calif., assignors to Syva Company, Palo Alto, Calif.

Continuation-in-part of Ser. No. 304,157, Nov. 6, 1972, which is a continuation-in-part of Ser. No. 143,609, May 14, 1971, abandoned. This application Feb. 1, 1974, Ser. No. 438,890

Int. Cl. C07g *7/02*

U.S. Cl. 195—99 **21 Claims**

1. An enzyme conjugate of glucose-6-phosphate dehydrogenase of the formula:

$$\left.\text{G—6—PDH}\right\}(\text{X—R—Y})_n$$

wherein:

G—6—PDH intends glucose-6-phosphate dehydrogenase;

n is the average number of groups bonded to the G—6—PDH and is in the range of 1 to 18;

X is a bond or non-oxocarbonyl, including the nitrogen and sulfur analogs thereof;

R is an aliphatic linking group of from 1 to 8 carbon atoms and 0 to 3 heteroatoms which are oxygen, sulfur, or nitrogen;

Y is a hapten of at least 125 molecular weight and not greater than about 1,000 molecular weight.

3,875,012

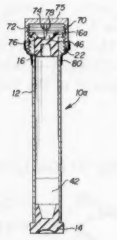
APPARATUS AND METHOD FOR THE DETECTION OF MICROBIAL PATHOGENS

Gordon L. Dorn, and Joseph M. Hill, both of Dallas, Tex., assignors to J. K. and Susie L. Wadley Research Institute and Blood Bank, Dallas, Tex.

Filed Jan. 30, 1974, Ser. No. 437,890

Int. Cl. C12K *1/04*

U.S. Cl. 195—103.5 R **25 Claims**



15. A method of detecting microbial pathogens in a body fluid comprising:

a. providing an aqueous filter solution between first and second injectable zones within a centrifugation tube, said aqueous filter solution containing a thermally sensitive gelling agent and being an aqueous solution of material which is non-toxic to said microbial pathogens and has a greater density than said sample fluid but able to selectively receive microbial pathogens from said sample fluid;

b. positioning said centrifugation tube such that said aqueous filter solution rests on said first injectable zone and thereafter cooling said centrifugation tube to cause said thermally sensitive gelling agent to solidify said aqueous filter solution;

c. depositing a treatment fluid for said body fluid upon said solidified aqueous filter solution by passing an injection needle through said second injectable zone and thereafter injecting said sample treatment fluid into said centrifugation tube and upon said solidified aqueous filter solution;

d. depositing a sample of said body fluid upon said solidified aqueous filter solution and admixing said body fluid with said treatment fluid by passing a hypodermic needle through said first injectable zone and through said solidified aqueous filter solution and thereafter injecting said body fluid through said hypodermic needle into said centrifugation tube;

e. heating said centrifugation tube sufficiently to liquefy said thermally sensitive gelling agent and thereby liquefy an aqueous filter solution;

f. subjecting said centrifugation tube to centrifugation in a manner to force said sample of body fluid against said aqueous filter solution and cause said microbial pathogens to selectively pass therein and thereby separate from the residual mass of said body fluid sample and said treating fluid; and

g. separating said aqueous filter solution containing said microbial pathogen from said residual mass of said body fluid.

3,875,013

ARTICLE FOR DETECTING THE FERTILE PERIOD AND METHOD FOR USING SAME

Jorge Martinez Manautou, and Adolfo Rosado Garcia, both of Mexico City, Mexico, assignors to Alza Corporation, Palo Alto, Calif.

Filed Feb. 16, 1973, Ser. No. 333,029

Int. Cl. G01n *31/14*

U.S. Cl. 195—103.5 R **10 Claims**

1. A test article useful for detecting an increase of N-acetyl-β-glucosaminadase in a female biological media which is coincident with the onset of the fertile period of a female, which article is comprised of a bibulous material containing impregnated therein a non-toxic buffer capable of maintaining the pH in the range of 4 to 5 and an effective amount of the color indicator p-nitrophenyl-n-acetyl-β-d-glucosaminide which in the presence of an increase of N-acetyl-β-glucosaminadase in the female biological media forms a color developing compound useful for detecting the fertile period.

3,875,014

GLUTAMIC OXALOACETIC TRANSAMINASE TEST MATERIAL

Peter Salvatore Forgione, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Dec. 14, 1973, Ser. No. 424,971

Int. Cl. C12k *1/04*; **C07g** *7/02*

U.S. Cl. 195—103.5 R **12 Claims**

1. A diagnostic test indicator for the detection and concentration determination of glutamic oxaloacetic transaminase in sera comprising a pair of bibulous materials the first of which contains therein, at a pH of from about 6.5 to about 9.5, the dried residue resulting from the impregnation thereof with

1. L-aspartic acid and
2. α-ketoglutaric acid and the second of which contains therein, at a pH of from about 2.5 to about 4.5, the dried residue resulting from the impregnation thereof with
3. a diazonium salt, said bibulous materials being positioned in superimposed relationship and adhered to one another with a cellulose acetate adhesive, said adhesive covering the entire adhering surface of either or both of the bibulous materials.

3,875,015

APPLICATOR FOR UNIFORMLY APPLYING A SAMPLE TO BACTERIAL GROWTH MEDIA

Clark Searle Wadley, Lake Forest, and Donald Sykes Kenney, Northbrook, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Continuation-in-part of Ser. No. 795,805, Feb. 3, 1969, abandoned. This application Nov. 15, 1973, Ser. No. 415,871

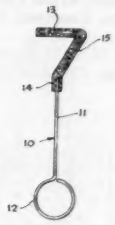
Int. Cl. C12k *1/10*

U.S. Cl. 195—127 **3 Claims**

1. An applicator for applying a sample to be examined to bacterial growth media, said applicator comprising:

an elongated frame having a tip disposed at one end transverse to said frame;

absorbent material fitted over the tip of said applicator to absorb the sample and including a permeable sleeve positioned over the absorbent material, said sleeve providing to the sample easy access to the absorbent material, whereby said applicator, when placed in the sample,



will absorb a precise quantity of sample and distribute the sample uniformly on the surface of the medium.

3,875,016

METHOD AND APPAPATUS FOR CONTROLLING THE OPERATION OF REGENERATIVELY HEATED COKE OVENS

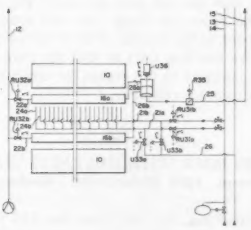
Helmut Schmidt-Balve, and Alfred Albertz, both of Bochum, Germany, assignors to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Continuation of Ser. No. 181,532, Sept. 17, 1971, abandoned. This application Oct. 29, 1973, Ser. No. 427,670

Claims priority, application Germany, Oct. 13, 1970, 2050153

Int. Cl. C10b *5/12*; **F16k** *11/00*

U.S. Cl. 202—151 **11 Claims**



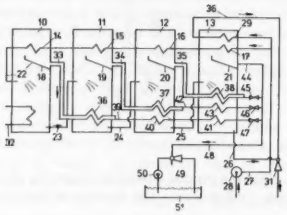
1. A battery of regeneratively heated coke ovens having heating walls and regenerators, and an apparatus for controlling the introduction of combustion gases through supply lines to the heating walls and the related regenerators and the discharge of burned gases from the regenerators, comprising control valves in the gas and air inlet to each heating wall and in the flue for burned gases from the regenerators, and control means operating said valves to control the flow of said gases to produce the maximum amount of heat during the first regenerative period of the total coking time and then less heat for a plurality of regenerative periods and finally still less heat during the remainder of the coking time.

8. A method of operating regeneratively heated coke ovens having heating walls and regenerators, comprising using the maximum amount of heat only during the first regenerative period of the total coking time, then using less heat for a plurality of regenerative periods, and then using still less heat for still more regenerative periods, whereby to limit the production of heat to the requirements of the ovens during the coking period.

3,875,017
MULTI-STAGE THIN FILM EVAPORATOR HAVING A HELICAL VAPOR FLOW PATH

Risto Vaino Juhani Saari, 02440 Luoma, Harjula, and Esko Ensio Huhta-Koivisto, Lumikintie 6 A 77, 00820 Helsinki 82, both of Finland

Filed Apr. 24, 1972, Ser. No. 246,670
Int. Cl. B01d *3/02*
U.S. Cl. 202—174 **7 Claims**

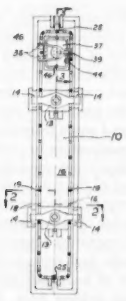


1. Evaporator, comprising an evaporator chamber, means for introducing the liquid to be evaporated into the evaporator chamber and for conducting the vapor there produced out of the evaporator chamber, a vertical heat exchanger within the evaporator chamber wherein the liquid to be evaporated flows downwardly, means for heating said heat exchanger with a fluid warmer than the liquid to be evaporated, whereby at least part of the liquid evaporates and a mixture of liquid and vapor is discharged onto the bottom of the evaporator chamber, means for removing the liquid from the bottom of the evaporator, a stationary helically shaped flow duct within the evaporator chamber into which flow duct the vapour ascends from the bottom of the evaporator chamber and is set into a powerful rotary motion, apertures on the outer periphery of said flow duct, a space surrounding the flow duct and closed at its top so that through said apertures the liquid droplets present in the vapor are flung into said space, whence the liquid flows back to the bottom of the evaporator chamber, an aperture above the flow duct so that the pure vapor escapes through said aperture to the means for conducting the vapor out of the evaporator chamber.

3,875,018
COKE OVEN DOOR WITH HEAT SETTABLE SEALANT

Albert Calderon, 1065 Melrose Dr., Bowling Green, Ohio 43402

Filed Jan. 26, 1973, Ser. No. 327,191
Int. Cl. C10b *25/06, 25/12, 25/16*
U.S. Cl. 202—248 **24 Claims**

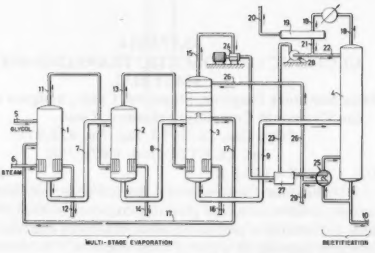


1. In a coke oven having a door movable between an open position and a closed position for opening and closing a portion of said oven, a first surface on the jamb of said oven, a door frame having a second surface, said first and second surfaces being suitably dimensioned so that when said door is in its closed position said surfaces lie substantially adjacent one another, conduit means for transporting sealant material, said conduit means being formed in at least one of said surfaces and opening toward the other surface, an inlet opening in said second surface and connected in fluid communication with said conduit means, heat settable sealant material, means for introducing said heat settable sealant material into said inlet opening, and means for removing sealant material from the conduit means upon movement of said door to the open position.

3,875,019
RECOVERY OF ETHYLENE GLYCOL BY PLURAL STAGE DISTILLATION USING VAPOR COMPRESSION AS AN ENERGY SOURCE

Gioacchino Cocuzza, Catania; Italo Montoro, Como, and Benedetto Calcagno, Milan, all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Dec. 26, 1973, Ser. No. 428,578
Claims priority, application Italy, Dec. 22, 1972, 33443/72
Int. Cl. C07c *29/26;* **C12f** *1/04*
U.S. Cl. 203—18 **1 Claim**



1. An improved process for the separation of ethylene glycol from the dilute aqueous glycol solutions originating from the hydrolysis of ethylene oxide by multi-stage evaporation of the glycol solutions and subsequent rectification of the concentrated aqueous glycol solutions, wherein the improvement comprises:

subjecting the dilute aqueous glycol solutions to three-stage evaporation at decreasing pressures in the range of from about 10 to 1.5 kg/cm² and at a temperature of about from 180° to 130°C to obtain, in the last stage, an aqueous solution containing about 70 to 80% by weight of glycols;

subjecting the aqueous glycol solution coming from the last stage of the multi-stage evaporation to rectification in a rectification column having five to 40 plates at a pressure of from about 50 to 400 mm mercury and at a temperature of from about 130° to 180°C in order to separate the residual water;

removing the vapours coming from the last stage of the multistage evaporator and using them as a heating means in the reboiler of the rectification column after previous thermal or mechanical compression;

removing the condensate coming from the reboiler of the rectification column and using it for washing at a temperature of from about 130° to 160°C of the vapours generated in the last stage of the multistage evaporation, weight ratios of wash water to vapours generated of from about 1:1 to 1:10 being maintained;

removing the wash solution from the last stage of the multistage evaporation and recycling it to the first stage.

3,875,020

EXTRACTIVE RECOVERY OF PALLADIUM CATALYST IN THE PRESENCE OF NITRIC ACID FROM THE RESIDUE OF AN ARYL ESTER DISTILLATION

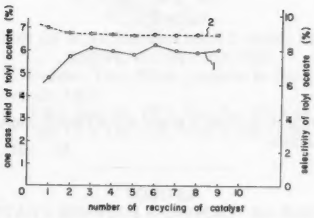
Nobuhiro Tamura, Ooimachi; Kazuo Suga, and Naoya Kominami, both of Tokyo, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Aug. 17, 1972, Ser. No. 281,452

Claims priority, application Japan, Aug. 21, 1971, 46-63859; Sept. 6, 1971, 46-68059

Int. Cl. B01d *11/00*

U.S. Cl. 203—43 10 Claims



1. A method of separating the liquid reaction mixture from the production of aryl esters of aliphatic carboxylic acids formed by replacement of a hydrogen on the aryl ring with an acyloxy group by reacting an aromatic hydrocarbon with an aliphatic carboxylic acid and oxygen in the presence of nitric acid and a palladium type catalyst,

Distilling the reaction mixture to separate unreacted starting materials and esters and

Extracting the distillation residue with a liquid paraffinic hydrocarbon containing from about six to eight carbon atoms or a liquid naphthenic hydrocarbon containing from about five to seven carbon atoms, to extract the reaction product and leave the catalyst together with nitric acid as a residue.

3,875,021

METHOD AND MEANS OF SENSING CHARACTERISTICS OF A BATH

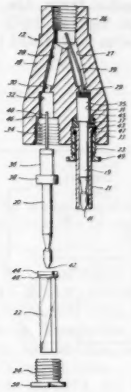
Frank I. Kiefer, Jr., Beaumont; Billy R. Clark, Groves, and James M. Ware, Port Arthur, all of Tex., assignors to Texas-U.S. Chemical Company, Parsippany, N.J.

Continuation of Ser. No. 84,993, Oct. 29, 1970, abandoned, which is a continuation-in-part of Ser. No. 873,168, Nov. 3, 1969, abandoned. This application Dec. 4, 1972, Ser. No. 312,198

Int. Cl. G01n *27/46*

U.S. Cl. 204—1 T 4 Claims

1. The method of resisting the buildup of latex in an aqueous latex bath upon a sensing electrode and its support body immersed in the bath which comprises the step of constructing at least the surface portions of both said immersed electrode and said immersed support body entirely of one or more of the



self-cleaning materials of the class consisting of procelain, glass, and wettable nylon.

3,875,022

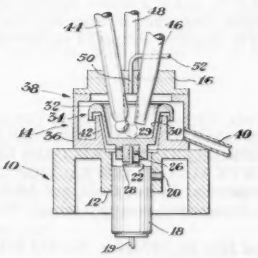
AUTOMATIC ELECTROMETRIC ANALYSIS

Jack J. Gilbert, 3 River Rd., Suffern, N.Y. 10901

Division of Ser. No. 275,298, July 26, 1972,. This application July 25, 1974, Ser. No. 491,886

Int. Cl. G01n *27/46*

U.S. Cl. 204—1 T 1 Claim



1. A method useful for analysis of liquid specimens for an electrochemically-measurable substance comprising:

providing a cup to hold a liquid specimen;

providing a sensing electrode adapted to measure the electrochemically-measurable substance;

pouring a liquid specimen into the cup from a point above the ultimate liquid level in the cup;

contacting the liquid in the cup with the sensing electrode;

rotating the cup at a first rate sufficient to result in liquid flow past the sensing electrode;

measuring the electrometric factor while the cup is rotating; and thereafter,

rotating the cup at a second rate substantially greater than the first rate, the second rate being sufficient to expel the liquid from the cup by centrifugal force.

3,875,023

ELECTRORECORDING PAPER

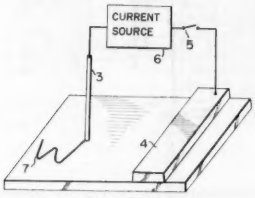
Yoichi Sekine, Katano, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 3, 1973, Ser. No. 320,820

Claims priority, application Japan, Apr. 5, 1972, 47-34762; May 31, 1972, 47-54666; Sept. 14, 1972, 47-92644

Int. Cl. B41m *5/20*; **G01d** *15/34*

U.S. Cl. 204—2 **18 Claims**



1. An electrorecording paper having a color-developing layer containing a component capable of changing color in response to applied heat, said color-developing layer comprising a heat coloring component and an electroconductive substance, both of which are dispersed in the form of fine particles in a binder; said electroconductive substance being substantially light reflective, electron conductive and having a specific resistance not greater than 10^4 Ωcm and selected from the group consisting of cuprous iodide, tin dioxide, silver-iodide, and antimony; and said color-developing layer having a surfacee resistivity of not greater than 10^7 Ωcm. at a temperature of 20°C. and at a relative humidity of 65%; said layer being capable of recording by changing color in response to heat applied by means of an applied electric current.

3,875,024

METHOD OF MANUFACTURING A MASTER DESIGNED FOR THE REPRODUCTION OF RECORDS READABLE OPTICALLY BY DIFFRACTION

Jean Edgar Picquendar; Eugene Duda, and Michel Marchal, all of Paris, France, assignors to Thomson-Brandt, Paris, France

Filed June 26, 1974, Ser. No. 483,434

Claims priority, application France, June 29, 1973, 73.24003

Int. Cl. B29d *17/00*; **G11b** *3/70*

U.S. Cl. 204—5 **10 Claims**

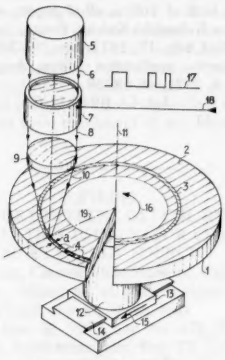
1. A method of forming a master designed to reproduce upon a record the impression of a track of predetermined width, made up of diffractive elements whose non uniform length and spacing constitute the transcription of a carrier waveform angularly modulated by an electrical signal bearing information, said method comprising the steps of:

selecting a substrate having an electrically insulating smooth face,

depositing upon said smooth face a conductive film of residue free volatilisable material,

causing the selective volatilisation of said film under the action of a concentrated radiation incident onto said film, and intensity modulated by said carrier waveform; said volatilisation occuring through the entire thickness of said film for forming perforations,

electroplating the portions of said film remaining on said substrate to provide a grown layer entirely capping said perforations.



3,875,025

METHOD OF FORMING A POLYMER COATING

Harvey A. Hodes, Eatontown, N.J.; James F. Sobieski, Saint Paul, Minn., and Michael C. Zerner, Uppsala, Sweden, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 195,058, Nov. 2, 1971, abandoned, which is a division of Ser. No. 41,113, May 27, 1970, Pat. No. 3,650,909. This application Apr. 18, 1973, Ser. No. 352,364

Int. Cl. B44c *1/04*; **B44d** *1/36*

U.S. Cl. 204—18 PC **1 Claim**

1. A method of forming a polymer image on a stainless steel plate including the steps of

A. activating the stainless steel plate,

B. making the activated stainless steel plate the anode of a light responsive electrolytic cell, said cell including a layer of photoconductive material sanwiched between a Nesa electrode as the cathode and said anode, the plate and the photoconductive layer being separated by an electrically conducting medium,

C. applying a potential of about 60 to 100 volts across the electrodes of said cell for several seconds while focusing an image on the cell,

D. removing said plate from said cell, and

E. immersing said plate in an aqueous solution of about 3 to 50 percent by weight of water soluble vinyl compound, the solution also being between 0.5 and 1.3 Normal in hydrochloric acid and containing 0.03 to 0.3 percent by weight of hydrogen peroxide to cause polymer to be deposited on the plate in image-wise fashion.

3,875,026

METHOD FOR PRODUCING ALUMINUM HOLOGRAPHIC MASTERS

Roland Werner Widmer, Rumlang, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed May 22, 1974, Ser. No. 472,293

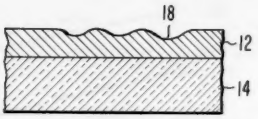
Int. Cl. C23b *5/00*, *5/58*

U.S. Cl. 204—27 **9 Claims**

1. A method for forming a master of a surface relief pattern comprising:

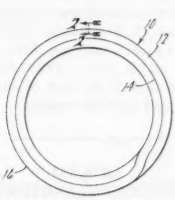
a. coating a photoresist on an aluminum substrate;

b. exposing the photoresist to an interference pattern;
c. developing a surface relief pattern which records said interference pattern on the surface of said photoresist;



d. transferring said interference pattern onto the surface of the aluminum substrate;
e. removing said photoresist; and
f. anodizing said aluminum surface.

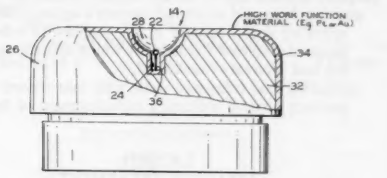
3,875,027
METHOD OF ELECTROPLATING TUBING PRIOR TO TERNE ALLOY COATING
Stanley F. Gondek, Troy, Mich., assignor to Bundy Corporation, Detroit, Mich.
Filed June 29, 1973, Ser. No. 374,883
Int. Cl. C23b *5/56, 5/50;* **C34f** *17/00*
U.S. Cl. 204—28 **6 Claims**



1. The method of making steel tubing which includes the steps of providing a steel strip having copper electroplated on the opposite sides thereof, rolling said strip into tubular form, furnace brazing said strip to bond and seal the tube, electrodepositing on the outer surface of the tube a primary coating consisting of one or more layers of the metals copper and nickel having a total thickness of between 0.0003 and 0.0019 inch and thereafter coating the tubing with hot terne alloy without intermediate heat treating sufficient to cause appreciable diffusion of said primary coating into the outer steel surface of said tubing.

3,875,028
METHOD OF MANUFACTURE OF X-RAY TUBE HAVING FOCUSING CUP WITH NON EMITTING COATING
Zed J. Atlee, Oak Brook, and Roy F. Kasten, Jr., Elmhurst, both of Ill., assignors to Picker Corporation, Cleveland, Ohio
Division of Ser. No. 284,735, Aug. 30, 1972, Pat. No. 3,783,323. This application Sept. 18, 1973, Ser. No. 398,478
Int. Cl. C23b *5/52;* **H01j** *9/00;* **C23c** *15/00*
U.S. Cl. 204—37 R **8 Claims**

1. A method of manufacture of an x-ray tube including a filament cathode mounted in a focusing cup electrode, in which the improvement comprises:
depositing non-electron emissive material onto the focusing cup including curved focusing surfaces within said cup so that said non-emissive material is bonded to the focusing cup, said non-emissive material having a higher work



function than the underlying base material of said cup to prevent the field emission of electrons by said cup.

3,875,029
PLATING BATH FOR ELECTRODEPOSITION OF BRIGHT TIN AND TIN-LEAD ALLOY
William E. Rosenberg, Strongsville, and William E. Eckles, Cleveland Heights, both of Ohio, assignors to R. O. Hull & Company, Inc., Cleveland, Ohio
Filed Feb. 19, 1974, Ser. No. 443,406
Int. Cl. C23b *5/14, 5/38, 5/46*
U.S. Cl. 204—43 S **15 Claims**

1. An aqueous acid tin electroplating bath containing stannous ions, at least one acid from the group consisting of sulfuric acid and flouboric acid, and having dissolved therein as a brightening agent about 0.05 to 0.5 gms/liter of a naphthalene monocarboxaldehyde.

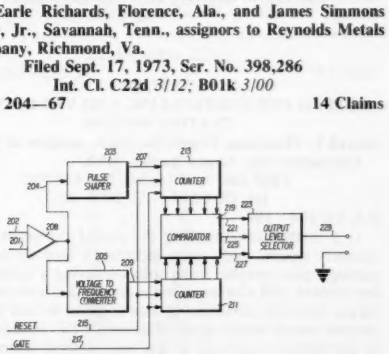
2. The bath of claim **1** wherein about 1 to 10 gms/liter of an emulsifying agent is added to solubilize the naphthalene monocarboxaldehyde.

3. The bath of claim **2** containing about 0.1 to 0.5 gms/liter of a substituted olefin of the general formula:

$$R_4 - \overset{R_3}{\underset{|}{C}} = \overset{R_2}{\underset{|}{C}} - R_1$$

where R_1 is carboxy, carboxamido, alkali carboxylate, ammonium carboxylate, amine carboxylate, or alkyl carboxylate, and R_2, R_3, and R_4 are hydrogen, methyl, or lower alkyl.

3,875,030
DETECTION OF GROUNDED ANODES
Nolan Earle Richards, Florence, Ala., and James Simmons Berry, Jr., Savannah, Tenn., assignors to Reynolds Metals Company, Richmond, Va.
Filed Sept. 17, 1973, Ser. No. 398,286
Int. Cl. C22d *3/12;* **B01k** *3/00*
U.S. Cl. 204—67 **14 Claims**



1. The method of detecting the position of an anode in an alumina reduction cell, said method comprising the steps of: measuring the total current through said anode over an interval of time and generating a reference value corresponding to

the number of current fluctuations which normally would occur during said time interval from the formation and release of gas bubbles at said anode when operating the cell with a properly adjusted anode for the current measured;

deriving from said measured current a second value corresponding approximately to the number of substantially sinusoidal current fluctuations which actually occur during said interval of time; and,

comparing said reference value with said second value to produce a signal indicating maladjustment of the anode.

3,875,031

EFFLUENT TREATMENT

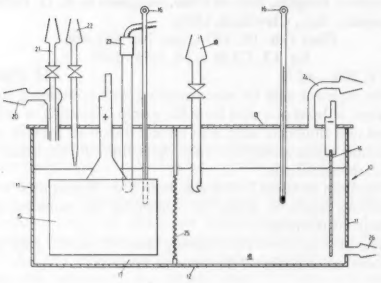
Cornelius Marthinus Stander, Kempton Park, South Africa, assignor to AE & CI Limited, Johannesburg, South Africa

Filed June 7, 1973, Ser. No. 368,046

Claims priority, application South Africa, June 26, 1972, 72/4407

Int. Cl. C01d *1/06;* **C01b** *7/00;* **C01d** *1/40*

U.S. Cl. 204—98 **7 Claims**



1. A method of treating aqueous effluent containing caustic soda and oxychlorine compounds comprising filling the anode and cathode compartments of an electrolytic diaphragm cell with effluent to provide an electrolyte, electrolysing the effluent and reducing the oxychlorine compounds to chloride ions and hydroxyl ions at the cathode, recovering chlorine from the anode compartment and sodium hydroxide solution from the cathode compartment while allowing the effluent to flow through the cell by introducing effluent into the cathode compartment.

3,875,032

METHOD FOR CONTROLLING A SILVER-RECOVERY PLATING SYSTEM

Darrell T. Thompson, Grandville, Mich., assignor to Foresight Enterprises, Inc., Grand Rapids, Mich.

Filed Jan. 3, 1974, Ser. No. 430,502

Int. Cl. C22d *1/12;* **B01k** *3/02*

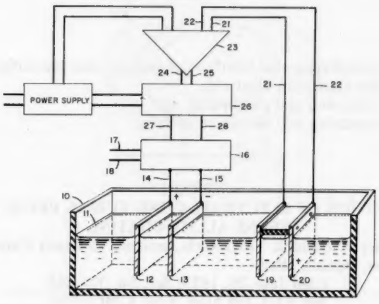
U.S. Cl. 204—109 **1 Claim**

1. A method of controlling the plating current in a silver-recovery system, said system including a tank normally containing a photographic fixing solution having a variable silver ion content, and also including a primary cathode and anode means normally immersed in said solution in said tank, and electric circuit means adapted to supply DC electric current to said primary electrode means, said method comprising:

immersing control cathode and anode means in said solution in said tank;

applying an electrical potential across said control cathode and anode means at a voltage adjacent to the threshold voltage required to induce a flow of current in said solution at zero silver content of said solution; and

controlling said electric circuit means to determine the current flow between said primary cathode and anode



means as a function of the flow of current between said control anode and cathode means.

3,875,033

METHODS FOR PRODUCING ANHYDROUS HYDRAZINE

George C. Pedersen, 155 Hillside Dr., Orchard Park, N.Y. 14127

Filed Apr. 6, 1973, Ser. No. 348,536

Int. Cl. B01j *1/10*

U.S. Cl. 204—157.1 H **11 Claims**

1. A method for producing enhanced yields of anhydrous hydrazine, the steps which comprise placing a quantity of a reaction mixture comprising liquid ammonia and a second component in a reaction zone; said second component being selected from the group consisting of a monohaloamine, a dihaloamine, a trihaloamine and mixtures of all three ammonia derivatives of a single halogen; exposing said reaction zone to a source of radiation energy under time and temperature conditions effecting decomposition of said liquid ammonia to hydrazine product and H radical, and the reaction of said second component with said H radical to produce additional hydrazine product; and withdrawing said hydrazine product from said reaction zone.

3,875,034

METHOD AND APPARATUS FOR ODOR ABATEMENT

Leon M. Adams, and Henry F. Hamil, both of San Antonio, Tex., assignors to Corn Refiners Association, Inc., Washington, D.C.

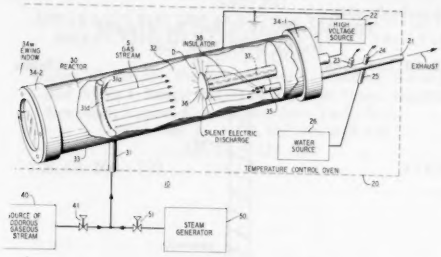
Filed Dec. 11, 1972, Ser. No. 314,185

Int. Cl. B01d *53/00;* **B03c** *9/02*

U.S. Cl. 204—165 **10 Claims**

1. The method of abating the odor of a gaseous stream containing at least one odorous organic compound obtained

in large part from the processing of grain, which comprises subjecting the stream to a silent electric discharge substan-



tially at the threshold of arcing to bring about the partial decomposition of said organic compound.

3,875,035

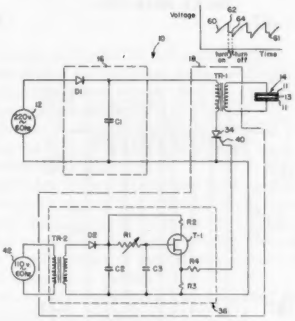
SOLID STATE FREQUENCY CONVERTER FOR CORONA GENERATOR

Frank E. Lowther, Phelps, N.Y., assignor to Purification Sciences, Inc., Geneva, N.Y.

Division of Ser. No. 174,691, Aug. 25, 1971, Pat. No. 3,784,838, which is a continuation-in-part of Ser. No. 141,148, May 7, 1971, abandoned, which is a continuation-in-part of Ser. No. 830,248, June 4, 1969, Pat. No. 3,798,457, which is a continuation-in-part of Ser. No. 709,485, Feb. 29, 1968, abandoned, which is a continuation-in-part of Ser. No. 612,751, Jan. 4, 1967, abandoned. This application July 3, 1973, Ser. No. 376,123

Int. Cl. C01b *13/10;* **H02m** *5/40*

U.S. Cl. 204—176 **3 Claims**



1. The method of applying higher frequency current from a lower frequency AC power source to a corona generator comprising at least one corona generating cell including a pair of spaced-apart electrodes and a layer of dielectric material therebetween, said method comprising connecting a frequency converter including a rectifier circuit, an SCR, a firing circuit and a transformer between said corona generator and said lower frequency AC power source, rectifying, the AC from said lower frequency power supply, and chopping the rectified current, at a frequency higher than the lower frequency of the current from said lower frequency AC power supply, with said SCR, said chopping including firing said SCR with said firing circuit, and automatically shutting off said SCR through said connection between said transformer and said corona generator.

3,875,036

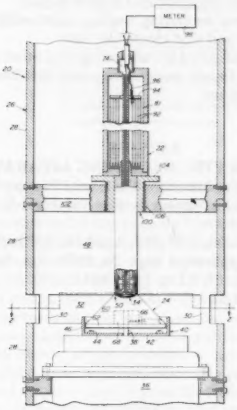
PROBE AND AGITATOR SYSTEM

George V. Morris, Riverside, R.I., and Gilbert E. Anderson, Fall River, Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Jan. 2, 1974, Ser. No. 430,273

Int. Cl. B01f *7/16;* **B01k** *3/00*

U.S. Cl. 204—195 P **9 Claims**



1. A probe assembly for monitoring a quantity of material contained in a fluid medium, the probe assembly comprising:

a probe having a terminus adapted to be submerged in said fluid, said terminus providing a signal in response to the presence of a preselected material within said fluid;

a generally conically shaped agitator having a vane portion at its apex, said vane portion having an edge substantially homothetic to a cross-sectional edge of said probe terminus, said vane portion being spaced apart from said probe terminus; and

means for rotating said agitator about an axis normal to said edge of said vane portion.

3,875,037

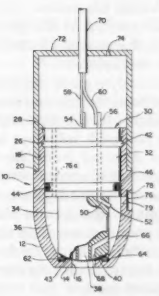
ELECTRODE STRUCTURE

Irwin H. Krull, Santa Ana, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Feb. 19, 1974, Ser. No. 443,485

Int. Cl. G01n *27/46*

U.S. Cl. 204—195 P **8 Claims**



1. An electrode assembly comprising:

a generally tubular body having a generally cup-shaped end with an axially extending aperture therethrough, said body having detent means on the inner surface thereof adjacent the other end, said other end being flexibly configured adjacent said detent means;

an insert member having an upper portion configured for mating engagement within said body and a lower portion having an electrode therein for positioning in proximity to said aperture, said upper portion having shoulder means for frictionally engaging said detent means;

membrane means in mating sealing relationship between said aperture and said electrode; and

cover means configured for encircling said other end of said body and for fixedly maintaining said shoulder means in said detent means.

3,875,038

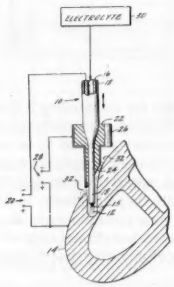
ELECTROLYTIC MACHINING APPARATUS

Lloyd J. McKinney, Lebanon, Ohio, and Wayne W. Ferrin, Greenfield, Wis., assignors to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 245,375, April 19, 1972, Pat. No. 3,795,604. This application Sept. 26, 1973, Ser. No. 400,925

Int. Cl. B23p *1/04*; **B01k** *3/00*

U.S. Cl. 204—224 M **3 Claims**



1. In apparatus for removing material electrolytically from a conductive workpiece, the apparatus including means to supply electrical power, an electrolyte supply and means holding a cathode-tool for opposed relationship with a workpiece;

the cathode-tool comprising:

a. an electrolyte guide member having a wall defining a hollow interior adapted to receive electrolyte and terminating in an electrolyte discharge port which directs electrolyte in a stream toward the workpiece,

b. a first electrode within the hollow interior,

c. a second electrode carried by the guide member outwardly of the wall, the second electrode having a tool surface facing the workpiece,

d. the wall of the electrolyte guide member being electrically isolated from both the first and second electrodes;

first means to supply to the first electrode electric current at a first potential sufficient to create in the electrolyte stream directed from the electrolyte discharge port toward and in contact with the workpiece a condition at least of incipient glow;

second means to supply to the second electrode electric current at a second potential less than the first potential and less than that sufficient to create in the electrolyte between the second electrode and the workpiece a condition at least of incipient glow;

the first and second electrodes being cathodic with respect to the workpiece.

3,875,039

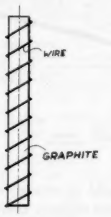
APPARATUS FOR DECOMPOSING AMALGAMS

Miroslav Matusek, Pardubice; Milan Franz, Usti nad Labem, and Ivo Rousar, Prague, all of Czechoslovakia, assignors to Vyzkumny Ustav Anorganicke Chemie, Usti nad Labem, Czechoslovakia

Filed May 29, 1974, Ser. No. 474,454

Int. Cl. B01k *3/04, 3/08*

U.S. Cl. 204—248 **4 Claims**



1. In a vertical apparatus for decomposing amalgam having a reaction body composed of a plurality of vertically spaced bars, the improvement wherein the bars are formed of active material non-wettable by amalgam over the surface of which spirals of wire of a material wettable by amalgam are wound.

3,875,040

RETAINING STRUCTURE FOR FRAMES OF MULTI-ELECTRODE ELECTROLYSIS APPARATUS

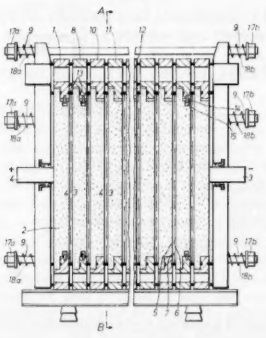
Carl Weltin, and Horst Pomiczinski, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 24, 1973, Ser. No. 354,033

Claims priority, application Germany, May 9, 1972, 2222637

Int. Cl. B01k *3/00*

U.S. Cl. 204—267 **2 Claims**



1. In an apparatus suitable for the electrolysis of hydrochloric acid and alkali metal chlorides and comprising a plurality of current-conducting electrodes having parallel faces, a plurality of frames respectively carrying the electrodes, means for holding said frames together in an assembly, and means for passing an electric current through said assembled electrodes, the improvement which comprises providing each frame and electrode with an aligned pin and recess extending parallel to the faces but spaced therefrom, whereby each electrode and its frame will move together in direction perpendicular to the faces, said pins being sufficiently smaller in external dimensions than the recesses to provide clearance therebetween at

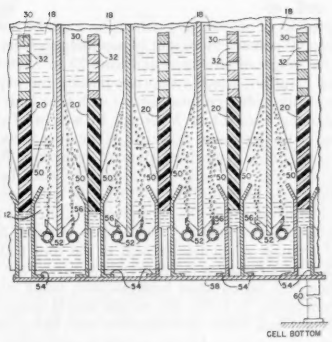
operative elevated temperature so that said electrodes can expand in direction parallel to their faces.

3,875,041

APPARATUS FOR THE ELECTROLYTIC RECOVERY OF METAL EMPLOYING IMPROVED ELECTROLYTE CONVECTION

Walter W. Harvey, Bedford; Myron R. Randlett, Burlington, and Karlis I. Bangerskis, Walpole, all of Mass., assignors to Kennecott Copper Corporation, New York, N.Y.

Filed Feb. 25, 1974, Ser. No. 445,435
Int. Cl. C22d *1/02*
U.S. Cl. 204—273 13 Claims



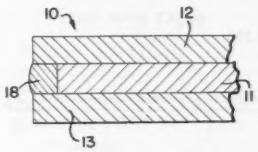
1. An electrodeposition cell comprising:
a. anodes for submergence in an electrolyte;
b. non-conductive anode bottom extensions positioned beneath the anodes;
c. non-conductive convection edge baffles positioned adjacent to opposite edges of the anode faces and extending toward the cathode faces;
d. cathodes, close spaced apart from said anodes, the submerged length of the cathodes being equal to or greater than the submerged length of the anodes and anode bottom extensions, the cathodes being wider than the anodes so that the edges of the cathodes extend outwardly from the convection baffles;
e. means for maintaining close spacing between anode-cathode faces; and,
f. bubble tubes having orifices for generating sheets of relatively small rapidly ascending bubbles of gas that result in agitation of the electrolyte over the cathode faces, the portion of said bubble tube having the orifices being positioned between the non-conductive anode extensions and the cathode face;
said baffles forming enclosures between cathode and anode faces which minimize lateral spreading and contraction of the sheet of bubbles and prevents deposition of metal at the edges of cathodes extending beyond the baffles, said anode bottom extension preventing deposition of metal at the bottom of the cathode face, said means for maintaining close spacing, said bubble tubes, and said baffles providing an electrolyte convection system which enables the efficient use of high current densities in an electrodeposition process with an attendant production of high quality metal which can be easily stripped from the cathodes.

3,875,042

ELECTRODE AND METHOD

James K. Grunig, Tucson, Ariz., assignor to The Anaconda Company, New York, N.Y.

Filed May 24, 1973, Ser. No. 363,746
Int. Cl. B01k *3/04*
U.S. Cl. 204—290 F 5 Claims



1. An electrode for use in electrometallurgical applications comprising a copper layer, a pair of refractory metal layers, said refractory metal layers being formed of like material and disposed in juxtaposed relation on opposite sides of said copper layer, said refractory metal layers forming outer layers of said electrode, said outer layers being coextensive one with the other and at least with said copper layer in those portions of said electrode not subject to anodic attack and extending beyond said copper layer in those portions of said electrode subject to anodic attack to define a channel outlined by an edge of said copper layer and extending portions of said outer layers, and means in said channel for sealing said copper layer in said portions of said electrode, said sealing means formed by a refractory valve metal having a melting point between that of the material of said copper layer and outer layers and substantially below that of the outer layers.

3,875,043

ELECTRODES WITH MULTICOMPONENT COATINGS

Charles R. Franks, North Madison; Barry A. Schenker, Mayfield Heights; Kevin J. O'Leary, Cleveland Heights, and James M. Kolb, Mentor, all of Ohio, assignors to Electronor Corporation, Panama City, Panama

Filed Apr. 19, 1973, Ser. No. 352,499
Int. Cl. B01K *3/04*
U.S. Cl. 204—290 F 14 Claims

1. An electrode comprising an electrically conductive supporting substrate bearing on at least a portion of the surface thereof a coating consisting essentially of from 1.0 to 10 percent antimony oxide, as Sb_2O_3, on a weight basis, from 30 to 90 percent SnO_2, from 1.0 to 50 percent of at least one platinum group metal oxide, and from 0.5 to 30 percent of a valve metal oxide selected from the group consisting of titanium and tantalum oxides, with the proviso that the mole ratio of tin to antimony oxides is between 95:5 and 85:15.

3,875,044

HYDRATABLE GEL SHEETS

Donald W. Renn, Glen Cove, and Ronald D. Forget, Owl's Head, both of Maine, assignors to Marine Colloids, Inc., Rockland, Maine

Division of Ser. No. 261,154, June 9, 1972, Pat. No. 3,837,960.
This application Feb. 14, 1974, Ser. No. 442,609
Int. Cl. B01r *5/00*
U.S. Cl. 204—299 2 Claims

1. A hydratable gel medium for use in molecular diffusion processes comprising a three-layer bonded assembly including a first layer of hydratable gel material, and second and third layers of water impervious supporting material, said first and second layers having mating openings extending completely therethrough with the walls of said openings perpendicular to the faces of said first and second layers and said third layer being imperforate, all three layers being bonded together throughout their opposing faces.

3,875,045

DEVICE FOR QUANTITATIVE AND QUALITATIVE DETERMINATION OF IONIZABLE COMPOUNDS

Bengt Goran Flemming Bergrahm, Helsinki, and Anna Maija Teppo, Haukilahti, both of Finland, assignors to Orion-Yhtyma Oy, Helsinki, Finland

Filed Sept. 20, 1972, Ser. No. 291,094

Claims priority, application Finland, Sept. 24, 1971, 2678/71

Int. Cl. B01k *5/00*

U.S. Cl. 204—299 8 Claims

1. Device for the quantitative and qualitative determination of ionizable compounds, such as proteins, particularly immunoglobulins, wherein antibodies to the substances to be determined being applied for the purpose of quantitative measurement to form a matrix, which most appropriately constitutes a gel, in which matrix the electrophoresis is carried out and wherein the antibody and the corresponding antigen produce a precipitation in the gel, the surface area or the height of the precipitate furnishing a measure of the quantity of the substance examined, and said device comprises a relatively thin, flat, tightly closable and openable box having a cover part and a dish part, said dish part being formed of a plate having a depression which has an even bottom, a matrix of uniform thickness, layer located in said depression, said layer having a height such that with the cover part placed upon the dish part and the box tightly closed so as to form an evaporation seal the matrix is not in direct contact with the inner surface of the cover part.

3,875,046

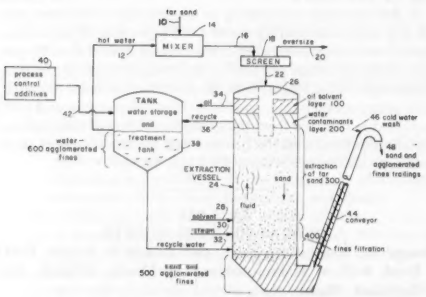
RECOVERY OF OIL FROM TAR SAND BY AN IMPROVED EXTRACTION PROCESS

William J. Rosenbloom, 8 Pioneer Rd., Westport, Conn. 06880

Filed Apr. 9, 1974, Ser. No. 459,268

Int. Cl. C10g *1/04*

U.S. Cl. 208—11 11 Claims



1. In a process for recovering oil from tar sand by extraction and phase separation, the improvement of a closed-cycle process comprising:

introducing the tar sand to a single-stage extraction vessel, flowing a liquid extraction stream including water countercurrent to the tar sand to maintain it in a fluidized bed condition,

separating an oil phase above the tar sand fluidized bed,

separating a water phase above the tar sand but below the oil phase,

withdrawing a water stream from the water phase in the extraction vessel,

recycling the water stream to the extraction vessel at a point below the top of the tar sand fluidized bed,

withdrawing the spent sand from the extraction vessel, and

withdrawing an oil stream from the oil phase in the extraction vessel.

3,875,047

PLATINUM-RHENIUM SERIAL REFORMING IN FOUR BEDS

Milton H. Dalson, Mendham; William C. Pfefferle, Middletown, both of N.J., and James P. Gallagher, Park Forest, Ill., assignors to Atlantic Richfield Company, New York, N.Y., by said James P. Gallagher and Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J., by said Milton H. Dalson and William C. Pfefferle

Continuation-in-part of Ser. No. 45,939, June 12, 1970, abandoned. This application Apr. 18, 1973, Ser. No. 352,098

Claims priority, application Canada, June 20, 1969, 54901

Int. Cl. C10g *35/08, 39/00*

U.S. Cl. 208—65 6 Claims

1. A process of reforming a petroleum naphtha containing from 40 to 60 percent by weight of naphthenes, from 5 to 25 percent by weight of aromatics and from 25 to 55 percent by weight of paraffins, which comprises passing the naphtha in admixture with hydrogen into contact with four beds of catalyst containing from 0.1 to 3 percent by weight of platinum and from 0.01 to 5 percent by weight of rhenium supported on a porous, solid base comprising alumina disposed in four beds arranged in series: the inlet temperature to each bed being within the range from 850° to 1,000°F.; the inlet pressure to the first bed being within the range from 100 to 350 psig; the weight hourly space velocity, based upon naphtha feed and the total amount of catalyst present in the four beds, being within the range from 2 to 6; the weight hourly space velocity in the first bed, based upon naphtha feed, being within the range from about 30 to 50; the weight hourly space velocity in the second bed, based upon naphtha feed, being within the range from about 20 to 40; the weight hourly space velocity in the third bed, based upon naphtha feed, being within the range from about 5 to 20; the total amount of hydrogen introduced into the reforming process being within the range from 2.5 to 12 mols of hydrogen per mole of naphtha, based upon the mols of fresh naphtha feed; and the sulfur content of the total feed being not more than 20 parts per million by weight.

3,875,048

REFORMING PROCESS USING PLATINUM-LEAD-THIRD COMPONENT CATALYST AND CATALYST THEREFOR

Toshyyuki Iwaisako; Kusuo Ohki, both of Saitamaken; Naoya Kominami, and Hisao Yomogida, both of Tokyo, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed June 30, 1972, Ser. No. 268,140

Claims priority, application Japan, July 5, 1971, 46-48789

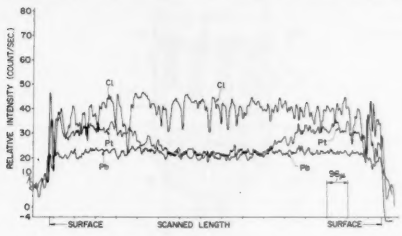
Int. Cl. C10g *35/06;* B01j *11/78*

U.S. Cl. 208—139 14 Claims

1. In the method for reforming hydrocarbons with a catalyst comprising a platinum component, a lead component and a third component all supported on a carrier, an improvement which comprises contacting hydrocarbons with a catalyst prepared by the steps which comprise compositing with a carrier in any order a platinum component, a lead component and a third component, the incorporation of said platinum component being carried out with a hydrochloric acid solution of a platinum component containing 0.1 – 10 percent by weight of hydrogen chloride based on the weight of the catalyst, and calcining the carrier supporting the platinum component, the lead component and the third component at a temperature of 570 – 1470°F to give a catalyst composition of 0.1 – 3 percent by weight chlorine, 0.01 – 2 percent by weight of platinum, 0.01 – 5 percent by weight of lead and 0.01 – 5 percent by weight of the third component metal, based on the weight of the catalyst, the weight ratio of lead to platinum

being in the range of 0.1– 3:1, and the third component metal being selected from the group consisting of zinc, cadmium and mercury the hydrocarbon being admixed with hydrogen in a mole ratio of 0.5 –15 moles of hydrogen per mole of hydrocarbon and contacted with the catalyst at an LHSV in the range of 0.2 – 10 $hr^{116\,1}$ and the reforming reaction being carried out at a temperature of 600°F to 1200°F at a pressure in the range of 0 – 700 psig.

13. A catalyst for reforming hydrocarbons comprising 0.01 – 2 percent by weight of platinum, 0.01 – 5 percent by weight



of lead, 0.1 – 5 percent by weight of a third component metal selected from the group comprising zinc, cadmium and mercury, and 0.1 – 3 percent by weight of chlorine all supported on a carrier, the weight ratio of lead to platinum being in the range of 0.1 – 3:1 and obtained by calcining the carrier supporting the catalytic components at 570°F – 1470°F, the platinum being supported on the carrier by impregnation with a hydrochloric acid solution of a platinum compound and the distribution of platinum and lead within the catalyst being in accordance with the X-ray spectrum pattern shown in FIG. 2 of the drawings.

3,875,049

PLATINUM-TIN CATALYST REGENERATION

Harris E. Kluksdahl, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 8,663, Feb. 4, 1970, , which is a continuation-in-part of Ser. No. 865,010, Oct. 9, 1969, abandoned. This application Apr. 30, 1973, Ser. No. 355,607. The portion of the term of this patent subsequent to Oct. 9, 1990, has been disclaimed.

Int. Cl. B01j *11/14*

U.S. Cl. 208—140 **4 Claims**

1. A regenerative process for the hydroconversion of hydrocarbons, which comprises (1) contacting the hydrocarbons at hydroconversion conditions in the presence of hydrogen with a catalyst comprising a platinum group component in an amount from 0.01 to 5 weight percent, a tin component in an amount from 0.01 to 5 weight percent, and a halogen in an amount from 0.1 to 3 weight percent in association with a porous solid carrier, until said catalyst has become deactivated by carbonaceous deposits, and (2) contacting the deactivated catalyst with an activating gas containing oxygen at elevated temperatures for a time sufficient to activate the catalytic composition.

3,875,050

METHOD FOR SEPARATING EDIBLE CRAB MEAT FROM NON-EDIBLE PORTIONS OF COOKED CRABS

Richard T. Wenstrom, Hampton, Va.; Theodore S. Reinke, Rehobeth Beach, Del.; Calvert B. Tolley, Wingate, and J. Clayton Brooks, Cambridge, both of Md., assignors to Sea Savory, Inc., Cambridge, Md.

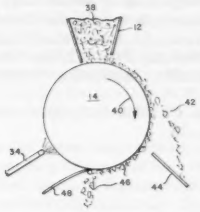
Continuation-in-part of Ser. No. 229,908, Feb. 28, 1972, abandoned. This application Jan. 30, 1974, Ser. No. 437,808

Int. Cl. B07b *13/00*

U.S. Cl. 209—11 **2 Claims**

1. A method of separating edible portions from non-edible portions of broken fragments of cooked crabs comprising the steps of

1. feeding the broken fragments to a hopper;
2. directing the broken fragments from the hopper to the surface of a drum disposed beneath the hopper,
3. rotating the drum at a peripheral speed in the range of 3 to 400 feet a minute;



4. heating the drum to a temperture within the range between 150° to 450°F such that the edible portions of the fragments will adhere to the drum surface and the non-edible portions will fall away from the drum surface; and
5. removing the edible portions from the surface of the drum.

3,875,051

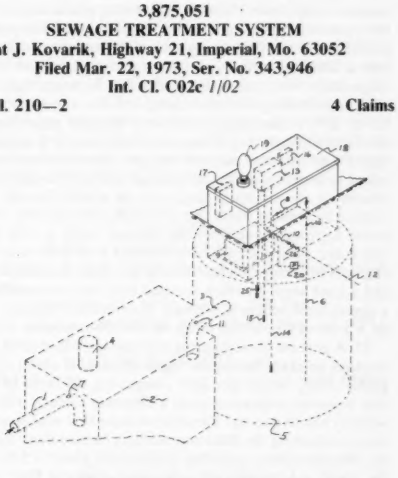
SEWAGE TREATMENT SYSTEM

Vincent J. Kovarik, Highway 21, Imperial, Mo. 63052

Filed Mar. 22, 1973, Ser. No. 343,946

Int. Cl. C02c *1/02*

U.S. Cl. 210—2 **4 Claims**



1. A method of treating and collecting sewage which comprises:

a. Collecting sewage in a plurality of containers;
b. Storing non-biodegradable sewage solids in each container;
c. Partially decomposing biodegradable solids through diagenetic decomposition in each container to reduce the biodegradable solids in size and alter their specific gravity;
d. Separating in each container liquid sewage containing suspended solids below a predetermined size from floating, settled and other solids;
e. Accumulating and temporarily storing liquids and suspended solids between predetermined levels in each container;
f. Pumping stored liquids and suspended solids from each container as the liquid reaches the predetermined upper level, using the storage of each container to promote a more even flow rate from a plurality of containers

through collection lines interconnecting each container and central final treatment means.

3,875,052

PROCESS FOR SEPARATING MICROSCOPIC ALGAE

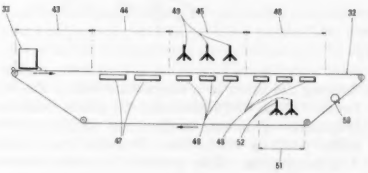
Daniel Lonchamp, Chatou; Hugo Van Landeghem, Vienne, both of France; Claudio Santillan Sanchez, and Alfonso Landa Verdugo, both of Mexico City, Mexico, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants and Sosa Texcoco SA, both of Rueil-Malmaison, France

Filed July 24, 1972, Ser. No. 274,252

Claims priority, application France, July 30, 1971, 71.28186

Int. Cl. C02b *3/02*; **B01d** *37/00, 13/00*

U.S. Cl. 210—23 **28 Claims**



1. A process for separating microscopic algae from a dilute aqueous suspension thereof, comprising a first step, in which the aqueous suspension of microscopic algae having an algae content of about **0.01** to **3** grams of dry weight per liter is fed onto a filtration surface, with such a relative velocity that said suspension, when contacting the filtration surface, carries away any forming filtration cake, and that a portion of about 0.5 to 20% of the liquid volume of the said suspension does not filter through said filtration surface resulting in a concentrated suspension, a second step, in which the said concentrated suspension is filtered through a filtration surface which retains an algae cake, a third step, in which the said cake is washed by feeding water therethrough, a fourth step, in which water is pressed out from the washed cake, a fifth step, in which the resulting cake is converted to a fluid mud by mechanical breaking of a fraction of the algae contained therein and a sixth step, in which the said fluid mud is transferred to a drying zone where it is dried, the filtration surfaces having each a mesh size in the range of 10–100 microns.

27. A process for separating microscopic algae from a dilute aqueous solution having an algae content of about 0.01 to 3 grams of dry weight per liter comprising the steps of feeding said aqueous suspension onto a filtration surface with such a velocity relative to the filtration surface that said suspension, when contacting the filtration surface, carries away any forming filtration cakes, and that a portion of about 0.5 to 20% of the liquid volume of said suspension does not filter through said filtration surface, resulting in a concentrated suspension, and filtering said concentrated suspension to form a filtration cake of algae on a filtration surface.

3,875,053

PROCESS FOR CARRYING OUT ION EXCHANGE AND ADSORPTION PROCESSES USING A COUNTERCURRENT VESSEL

Gunter Siegers, Schildgen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

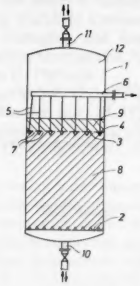
Filed Apr. 25, 1973, Ser. No. 354,627

Claims priority, application Germany, May 3, 1972, 2221561

Int. Cl. B01d *15/06*

U.S. Cl. 210—35 **2 Claims**

1. A method for carrying out ion exchange or adsorption employing a container provided with inlet-and-outlet tubes adjacent the top and bottom, an intermediate inlet-and-outlet tube, and a lower plate for retaining solid ion exchange or adsorption material while permitting passage of liquid, comprising filling said container with ion exchange or adsorption material to a level above the level of communication between the container and the intermediate tube, so as to form an active layer of material extending from the container bottom to said intermediate tube communication level surmounted by a covering layer of material above said intermediate tube communication level, passing activating or regenerating liquid



from said top tube downwardly through all said material and out said bottom tube, passing sufficient untreated liquid to serve as a rinse liquid from said top tube downwardly to displace substantialaly all of said activating or regenerating liquid, passing liquid to be treated upwardly from said bottom tube and out said intermediate tube without backing up into said covering layer until the capacity of the ion exchange or adsorption material is significantly diminished, and then repeating the sequence of steps.

3,875,054

USE OF OXIDIZED CATIONIC STARCH IN FLOCCULATION AND DEWATERING OF MUNICIPAL SLUDGE

Walter G. Hunt, Bridgeton, and Ray J. Belz, Mehlville, both of Mo., assignors to Anheuser-Busch Incorporated, St. Louis, Mo.

Division of Ser. No. 335,518, Feb. 26, 1973, Pat. No. 3,835,114. This application Mar. 4, 1974, Ser. No. 447,656

Int. Cl. B01d *21/01*

U.S. Cl. 210—54 **5 Claims**

1. A method of treating raw primary sedimented sewage sludge including the steps of adding from 0.016% to 0.1875% by weight (based on the dry weight of the sludge) of gelatinized oxidized cationic starch ether of amine butene halide to raw primary sedimented sludge, said starch ether having a carboxyl content equivalent to a degree of substitution of about 0.0036 to about 0.0108 and a degree of substitution of amine butene halide of about 0.15 to 0.25, flocculating the sludge, and dewatering the sludge to below about 70% moisture.

3,875,055

APPARATUS AND METHOD

Martin P. Grosboll, Homewood, and Robert R. Edison, Olympia Fields, both of Ill., assignors to Atlantic Richfield Company, Los Angeles, Calif.

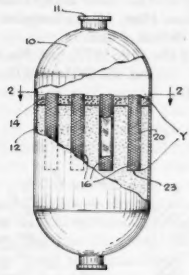
Filed Oct. 9, 1973, Ser. No. 404,471

Int. Cl. B01d *29/42*

U.S. Cl. 210—73 **19 Claims**

1. An apparatus for removing particulate impurities from a fluid stream flowing in a generally downwardly direction into a bed of discrete solid elements comprising catalyst particles, said apparatus comprising a plurality of hollow elongated basket members each adapted to be generally aligned along its

longitudinal axis with the direction of fluid flow and to extend along a substantial portion of its length into said bed of solid elements, provided that atleast a portion of said fluid is allowed to directly enter the top opening of each said basket member, each said top opening being essentially at or above the level of said bed of solid elements, each said basket member being defined by a bottom end wall, and sidewalls at least a portion of which are of open mesh construction adjacent to said bottom end, wherein one-half the average of the closest distances between closest basket members multiplied by the average longitudinal distance of the sidewalls of open mesh construction in said bed of solid elements is at least about 0.75 ft.^{2}.



3,875,056

DEVICE FOR SEWAGE TREATMENT

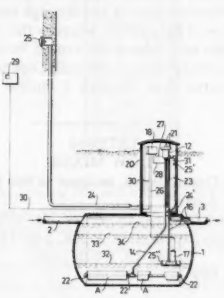
Douglas Johnstone Inglis, Aberdeen, England, assignor to Stenberg-Flygt AB, Solna, Sweden

Continuation of Ser. No. 84,706, Oct. 27, 1970, abandoned. This application Nov. 10, 1972, Ser. No. 305,394

Claims priority, application Sweden, Jan. 27, 1970, 1010/70

Int. Cl. C02c *1/18*

U.S. Cl. 210—93 **7 Claims**



1. An apparatus for the biological treatment of liquid sewage from a household toilet or similar unit utilizing the variations in the flow of liquid sewage in the course of a day in order to utilize periods of non-use of the toilet unit for the sedimentation of sludge formed or contained in the liquid sewage and for drawing off clarified supernatant liquid, said apparatus comprising

a. a generally horizontal tank for receiving, collecting and treating liquid sewage, said tank having a generally horizontal top and upstanding end walls;

b. a continuously open sewage inlet conduit opening into one upstanding end wall at the top thereof in the vicinity of said horizontal top;

c. a weir overflow conduit connected to the end wall of said tank opposite said end wall to which said sewage inlet conduit is connected, the highest point at which said weir overflow conduit is connected through said opposite end wall being equal to the height of the opening of said inlet conduit and determining an overflow level within said tank;

d. an aerating device including an aerator located near the bottom of said tank for aerating the contents of said tank;

e. a control unit for controlling operation of said aerating device;

f. a pump within said tank for draining liquid from said tank;

g. conduit means leading from said pump to the exterior of said tank for draining the liquid from the tank;

h. motor means operatively connected to said pump to drive same; and

i. means to operate said control unit cyclically to control the function of the aerating device in at least three stages in the course of a day including a first stage during which the liquid sewage continuously collects in the tank and is aerated with subsequent flocculation and sludge formation, a second stage which is chosen to coincide with the periods of non-use, during which non-use aeration is interrupted and the sludge formed is permitted to settle on the bottom of the tank, and a third stage during which the pump draws off clarified supernatant liquid from above the settled sludge; said pump being positioned in said tank above the level of said aerator and below the weir overflow conduit and providing two operating liquid levels within said tan, the first liquid level being above the aerator and corresponding to said third stage of operation, the second liquid level being a level intermediate said first liquid level and below the overflow level within said tank, said second level being provided during said second stage of operation and being positioned sufficiently above said first level such that liquid sewage possibly flowing into said tank from said sewage inlet conduit, during the periods of nonuse does not interfere with sedimentation of sludge or with the discharging of clarified supernatant by by pump.

3,875,057

TANK CLARIFICATION PLANT

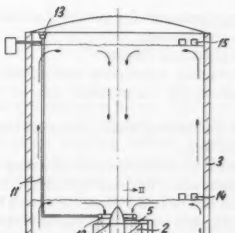
Joseph Richard Kaelin, Villa Seeburg, CH-6374, Bouchs, Switzerland

Filed Nov. 21, 1972, Ser. No. 308,598

Claims priority, application Switzerland, Nov. 22, 1971, 17044/71

Int. Cl. B01f *3/04;* **C02c** *5/06*

U.S. Cl. 210—104 **12 Claims**



1. A tank clarification plant, particularly for large-scale irregular sewage influx, in which septic and clarification tanks are represented in succession by a common chamber and the

maximum and minimum levels vary between relatively wide limits, comprising:

a tank;

a liquid circulation member disposed adjacent the lower region of said tank substantially in the central area thereof and having a plurality of impeller blades for causing liquid in said tank to circulate in a direction from above said impeller blades, through and between said impeller blades, to the outer peripheral regions of said tank of and to the upper level of the liquid in said tank; at least one stationary cutting blade disposed immediately adjacent said liquid circulation member and having leading edges contiguously cooperable with said impeller blades of said liquid circulation member for producing a shearing effect therebetween;

a conduit in said tank open at one end to the exterior of said tank and at the other end immediately above said liquid circulation member for introducing an oxygen-containing gas mixture to the immediate vicinity of the inlet side of said liquid circulation member for being circulated and moved with said liquid through said impeller blades; and means for controlling the level of said liquid in said tank for insuring that said level of said liquid is always above said liquid circulaton member.

3,875,058

PURIFYING APPARATUS FOR PURIFYING CONTAMINATED WATER

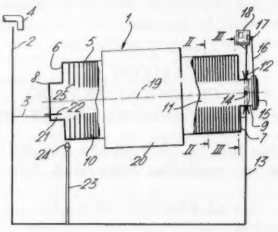
Sigvard Nordgard, Saltsjobaden, Sweden, assignor to Sanaqua SA, Geneva, Switzerland

Filed Nov. 20, 1972, Ser. No. 307,901

Claims priority, application Sweden, Nov. 25, 1971, 1511/71

Int. Cl. B01d *33/34*

U.S. Cl. 210—151 **10 Claims**



1. A purifying apparatus for purifying contaminated water, said apparatus comprising:

a rotatable cylindrical casing;

means for rotatably supporting said cylindrical casing for rotation about the longitudinal axis of said cylindrical casing;

drive means for rotating said cylindrical casing about said longitudinal axis;

an inlet at one end of said cylindrical casing for entry of the contaminated water into said cylindrical casing; an outlet at the other end of said cylindrical casing for discharge of the contaminated water from said cylindrical casing;

helical baffle means extending longitudinally of the interior of said cylindrical casing and fixed to said cylindrical casing for displacing the contaminated water along said cylindrical casing from said inlet towards said outlet in contact with microorganisms on said helical baffle means on rotation of said cylindrical casing;

float means associated with said cylindrical casing for floatingly supporting said cylindrical casing on a body of said contaminated water, such that said support means supports said cylindrical casing on said float means;

a filter material at least partly filling said float means; and means at the outlet end of said helical baffle means for discharging water from said cylindrical casing into said float means, and means defining an outlet for the water from said float means.

3,875,059

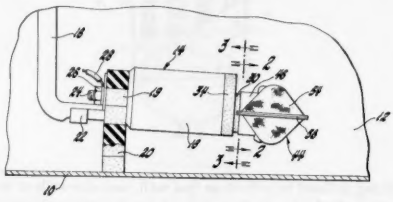
ELECTRIC FUEL PUMP STRAINER STAND-OFF

Dale C. Maschino, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 10, 1973, Ser. No. 423,139

Int. Cl. B01d *35/02*

U.S. Cl. 210—172 **1 Claim**



1. A combination fuel pump and strainer assembly of the immersible type adapted to be supported within a vehicle fuel tank by the fuel discharge line including a housing which encloses fuel pump means for drawing fluid from said tank and passing it into said discharge line, said housing having a tubular inlet portion extending therefrom with an open end, a fuel strainer assembly including an annular collar member engagingly encircling said inlet portion of the housing and defining an opening thereto, a fuel strainer of flexible and pervious material formed in a generally cylindrical configuration with an enclosed interior, an aperture in the wall of the strainer with its surrounding edge portion attached to said collar member around said collar opening, thereby causing fuel to flow first through said pervious strainer material and subsequently through said collar opening into said inlet of the housing to prevent foreign particles from entering the fuel pump and the discharge line, said housing having elongated members projecting from said inlet opening and through said collar opening into said interior of the strainer whereby the suction action of fuel flowing into said inlet is prevented from collapsing the flexible strainer material over the collar opening which would undesirably restrict flow through a limited portion of said strainer.

3,875,060

FLOW MIXER

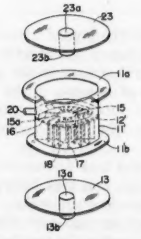
Shigeki Noma, Osaka, Japan, assignor to Sun Engineering Co., Inc., Osaka, Japan

Filed June 14, 1974, Ser. No. 479,571

Claims priority, application Japan, Jan. 11, 1974, 49-6841

Int. Cl. C02b *1/20*

U.S. Cl. 210—199 **10 Claims**



1. A device for stirring liquid medium by the flow of the liquid medium passing therethrough under pressure, which

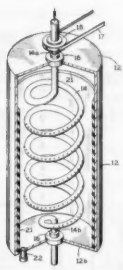
comprises a cylindrical hollow body having both ends closed by first and second plate members, respectively, a sleeve stationarily housed within said cylindrical hollow body in alignment with the longitudinal axis of said cylindrical hollow body and having both ends terminating at the first and second plate members, said sleeve further having a clearance extending in parallel to the longitudinal axis of said sleeve, said clearance communicating between the hollow of said sleeve and a space that is defined between said sleeve and said cylindrical body, a first opening formed in said first plate member adjacent the periphery of said first plate member and communicating between said space and the outside of said device, a second opening formed in said second plate member and communicating between said hollow of said sleeve and the outside of said device, a partition wall rigidly housed within said space with both ends thereof terminating at said first and second plate members, one side edge of which is secured to one of the opposite edges of said clearance and the other side edge of which partition wall is secured to the cylindrical hollow body, and means housed within said space for guiding the flow of the liquid medium, that has entered either of said first and second openings, in a substantially zig-zag manner towards the other opening and also for alternately expanding and contracting said liquid medium during the flow thereof from said either of said first and second opening towards said other opening thereby creating a turbulence required to severely stir said liquid medium passing therethrough under pressure.

3,875,061

CENTRIFUGAL SEPARATOR WITH FIELD EFFECT SEPARATION

James R. Palma, 1502 Curry Rd., Schenectady, N.Y. 12306

The portion of the term of this patent subsequent to Dec. 19, 1989 has been disclaimed.
Filed Aug. 27, 1973, Ser. No. 392,088
Int. Cl. B01d *35/06, 33/02*
U.S. Cl. 210—223 **9 Claims**



1. In a fluid separator for separating contaminants from a moving fluid, said separator including in combination, a housing, a spirally shaped conduit extending through said housing having a plurality of helical coils in said housing and having external portions available outside said housing providing an inlet and an outlet so that fluid containing contaminants may be supplied into said inlet through said coils and out said outlet, said conduit having a plurality of openings therethrough each communicating from the interior of said conduit to an area outside said conduit within said housing, said openins being spaced lengthwise along the length of said conduit and providing paths through which contaminants can escape from the fluid in said conduit, an abutment projection cooperating with each of said openings and aligned with the fluid flow path past said openings, each said abutment projecting inwardly of said conduit to cause fluid flowing through said conduit to swirl in an eddy current in one direction at a leading edge of the respective abutment and to swirl in an eddy current in the opposite direction at a trailing edge of the respective abutment and means drivingly connected to said conduit to continuously rotate the coiled portion of said conduit within said housing to create centrifugal forces which eject contaminants from the swirling eddy currents through the openings, the improvement which comprises:

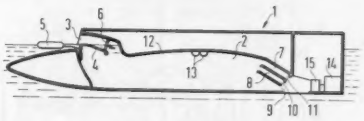
means for producing, inside said housing and outside said spirally shaped conduit between said inlet and outlet, an electrical force field which is effective to attract field sensitive particles in the contaminants passing out of the conduit through said openings therein.

3,875,062

DEVICE FOR CLEANING WATER POLLUTED BY OIL

Johann Rafael, Maxstrasse 36, Salzburg, Austria

Filed Sept. 25, 1973, Ser. No. 400,633
Claims priority, application Germany, Sept. 25, 1972, 2246958
Int. Cl. E02b *15/04*
U.S. Cl. 210—242 **6 Claims**



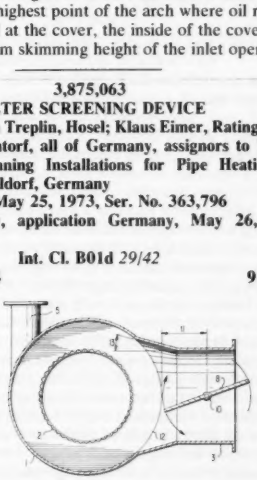
1. A device for cleaning water polluted by oil, comprising a floating body which contains an inlet opening and a collecting chamber for the polluted water, the collecting chamber having a cover and the water surface polluted by oil inside the collecting chamber being fully or partly in contact with the cover, the cover being so arched that the oil accumulates preferably at the highest point of the arch where oil removal means is provided at the cover, the inside of the cover being below the minimum skimming height of the inlet opening.

3,875,063

FILTER SCREENING DEVICE

Friedrich-Wilhelm Treplin, Hosel; Klaus Eimer, Ratingen, and Heinz Thal, Lintorf, all of Germany, assignors to Ludwig Taprogge (Cleaning Installations for Pipe Heating Exchanger), Dusseldorf, Germany

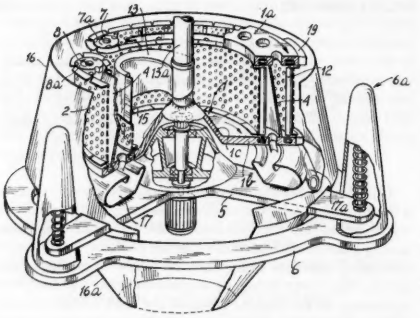
Filed May 25, 1973, Ser. No. 363,796
Claims priority, application Germany, May 26, 1972, 2225726
Int. Cl. B01d *29/42*
U.S. Cl. 210—304 **9 Claims**



1. In a filtering installation for separating solids from liquid streams in pipelines, said filtering installation comprising a cylindrical separator housing means, a cylindrical filtering means disposed within said separator housing means, radial inlet pipe connection means disposed at a peripheral surface of said separator housing means for introducing a liquid stream carrying solids into said separator housing means, an outlet pipe connection means disposed axially adjacent an end of said cylindrical filtering means for discharging said liquid stream after passing through said cylindrical filtering means, a discharge means connected to said separator housing means for discharging solids separated from said liquid stream by said cylindrical filtering means, and valve means pivotally arranged in said inlet pipe connection means for adjusting the flow of said introduced liquid stream, the improvement comprising said valve means being a circular butterfly valve element pivotal about an axis spaced from a peripheral circle of said

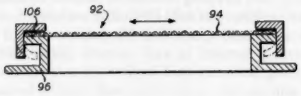
cylindrical separator housing at a distance corresponding at least to the radius of said circular valve element, and said inlet pipe connection means flaring at the connection with said separator housing means at a flaring angle of at least 15°.

3,875,064
CONTINUOUS DISCHARGE CENTRIFUGE
Marcello Camerino, Via Pietrasanta 12, 20141 Milan, Italy
Filed Sept. 11, 1972, Ser. No. 287,935
Claims priority, application Italy, Oct. 1, 1971, 29399/71
Int. Cl. B04b *3/08*
U.S. Cl. 210—370 **1 Claim**



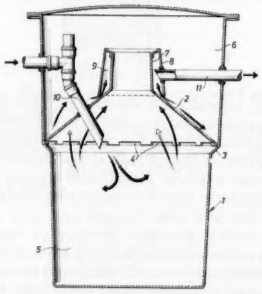
1. A continuous discharge centrifuge for separating the solid portion of a slurry material from the liquid portion thereof, and more particularly fibrous matter from liquid, comprising in combination: a substantially circular revolving structure having guiding means defining substantially circular paths; a vertically arranged filtering structure supported by said revolving structure, said revolving structure having an upper annular plate member a lower plate member and therebetween a frustoconical baffle member rigidly connecting said upper with said lower plate member, an arcuate, centrally mounted material diffuser spanning the full height of said filtering structure and having a flexible outlet edge flap member; a feeding hopper centrally mounted above said diffuser and connected thereto; an annular, liquid collecting box mounted beneath said baffle member; an outer casing of substantially frusto-conical configuration for conveying the separated solid portion downwards; a solid portion receiving hopper mounted underneath said outer casing; a frame structure vibration dampening means supporting said frame structure; and a centrally located motor suspended from said frame structure for the purpose of driving said revolving and filtering structures; wherein said filtering structure has a widthwise straight endless belt of foraminous material having flange formation on the longitudinal edges thereof, said belt being mounted for rotation with said revolving structure and arranged to simultaneously circulate in said substantially circular paths concentric to said revolving structure, thereby defining a substantially cylindrical enclosure comprising a filtering inner run whereon said solid portion collects the liquid portion passing therethrough, and an outer or return run, said endless belt having lower and upper roller means guided along said circular paths, by said guiding means, at least one driving drum and nearby at least one return drum for said endless belt, said endless belt having a drive loop wound around said driving drum and a return loop wound around said return drum said drive and return loops defining a gap therebetween, said endless belt forming a continuous filtering surface exepting said gap, for the solid portion to detach from said filtering surface under centrifugal acceleration, said baffle member being arranged between said belt runs.

3,875,065
VIBRATORY SEPARATOR SCREEN
Jesse Rosenblum, 112 Roosevelt St., Closter, N.J. 07624
Continuation-in-part of Ser. No. 241,142, April 5, 1972, Pat. No. 3,792,774. This application Sept. 17, 1973, Ser. No. 397,870
Int. Cl. B07b *1/28*
U.S. Cl. 210—388 **4 Claims**



1. A vibratory separator screen comprising an annular frame including a peripheral side wall having an upper extent and a lower extent with an annular lip extending radially outward from said upper extent; a mounting ring having an aperture therein, said ring having a substantially right-angled cross section defined by intersecting horizontal and vertical segments, the inner diameter of said vertical segment being normally less than the outer diameter of said annular lip a cloth of desired mesh secured to the mounting ring and spanning said aperture therein and means for fixedly bonding a segment of said cloth to said mounting ring about substantially the entire periphery of said cloth for securing said cloth thereto at a first multidirectional substantially uniform level of tension across said cloth less than a predetermined multidirectional substantially uniform level of tension, the mounting ring being force fit at its vertical segment onto said frame over said annular lip to increase the level of tension of said cloth and hold said cloth taut about substantially said entire periphery to provide said predetermined level of tension for said cloth and to maintain the cloth at said predetermined level of tension.

3,875,066
SLUDGE SEPARATOR
J. Henric Lind, Solna, Sweden, assignor to Pdypur Forsaljnings AB, Sundbyberg, Sweden
Filed Jan. 7, 1974, Ser. No. 431,341
Int. Cl. B01d *21/00*
U.S. Cl. 210—521 **4 Claims**



1. An apparatus for separating sinking and buoyant contaminants from sewage, particularly from domestic sewage and the like, said apparatus comprising a substantially cylindrical vessel arranged on a generally vertical axis, a partition of inverted generally frusto-conical shape disposed coaxially in said container intermediate its ends and dividing the same into upper and lower chambers, said partition having the lower edges thereof terminating proximate to the container wall to define therewith peripheral slots communicating between said

chambers and its upper end forming a centrally situated upwardly directed opening, a tubular sleeve surrounding the upper end of said partition to define therewith an annular compartment and having its lower end spaced from said partition to admit liquid therein, an outlet pipe for clear effluent communicating at its inner end with the interior of said annular compartment and extending outside said container, said outlet pipe establishing a working liquid level in said container, and a sewage inlet pipe extending into said container with its inner end opening into said lower compartment at a level substantially below said working level to introduce fresh sewage into said container, whereby sinking contaminants collect in said lower chamber directly from said inlet pipe and indirectly by gravitation down the external sloping surface of said partition through said peripheral slots while buoyant contaminants are isolated from said outlet pipe opening by the internal sloping partition surface and said tubular sleeve.

3,875,067

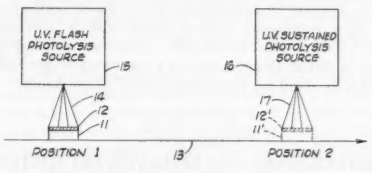
PHOTOPOLYMERIZATION APPARATUS

Miksa DeSorgo, Olmsted, and Vincent D. McGinniss, Middleburgh Heights, both of Ohio, assignors to SCM Corporation, Cleveland, Ohio

Filed June 25, 1973, Ser. No. 373,374

Int. Cl. B01j *1/10*

U.S. Cl. 250—527 **4 Claims**



1. In combination with an ultraviolet photopolymerizable material, an apparatus for irradiating a mass of said material located within an irradiation area and disposed within an air-inhibited atmosphere comprising:

a first ultraviolet light source for irradiating said material within said irradiation area, said first source being a flash photolysis light source emitting pulse irradiation whereby said material is cured superficially;

a second ultraviolet light source for irradiating said material within said irradiation area, said second source being a sustained photolysis light source emitting substantially continuous ultraviolet light whereby said material is profoundly cured.

3,875,068

GASEOUS PLASMA REACTION APPARATUS

James W. Mitzel, Richmond, Calif., assignor to Tegal Corporation, Richmond, Calif.

Filed Feb. 20, 1973, Ser. No. 333,880

Int. Cl. H01t *19/00*; **B01k** *3/00*

U.S. Cl. 250—531 **31 Claims**

1. A gaseous plasma reaction apparatus comprising in combination:

a reaction chamber having means for introducing and removing non-gaseous materials;

means for introducing and distributing a gas into said reaction chamber;

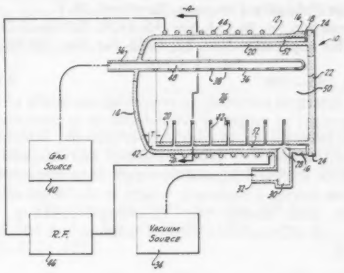
means for ionizing the gas in the reaction chamber into a plasma;

means for controlling the flow and distribution of said plasma with said reaction chamber;

means for minimizing local electromegnetic field effects on said plasama within said chamber comprises in combination:

an outer vessel of a generally symetrical configuration composed of an insulative material;

an inner vessel of a generally similar symetrical configuration as said outer vessel also composed of an insulative material and disposed in a nested symetrical relationship within said outer vessel, the interior of said inner vessel defining said reaction chamber;



a shell zone surrounding said reaction chamber defined by the interior wall of said outer vessel and the exterior wall of said inner vessel, containing a conductive gaseous plasma; and

means for withdrawing gas from said reaction chamber.

3,875,069

LUBRICANT COMPOSITIONS USEFUL IN THE SHAPING OF THERMOPLASTIC MATERIALS

Kurt Worschech, Bexhovede; Kurt Wolf, and Helmut Kachel, both of Bremerhaven, all of Germany, assignors to Neynaber Chemie GmbH, Bremerhaven, Germany

Filed Apr. 13, 1973, Ser. No. 350,917

Claims priority, application Germany, Dec. 20, 1972, 2262266

Int. Cl. C10m *1/24*

U.S. Cl. 252—56 S **11 Claims**

1. A lubricant composition useful in the shaping of thermoplastic material consisting essentially of (A) mixed esters with hydroxyl and acid numbers of 0 to 6 of adipic acid, pentaerythrite and an aliphatic hydrocarbon monocarboxylic acid with 12 to 30 carbon atoms in an average molar ratio of about $(n-1):n:4n-2(n-1)$, wherein n is an integer from 2 to 11, said mixed esters having a molecular weight of at least 524, and (B) esters selected from the group consisting of (1) esters of phthalic acid and alkanols of 12 to 30 carbon atoms, and (2) partial esters of glycerin and aliphatic hydrocarbon monocarboxylic acids having 12 to 30 carbon atoms and mixtures of partial esters of glycerin and hydroxyalkanoic acids having 12 to 30 carbon atoms and triglycerides of hydroxyalkanoic acids having 12 to 30 carbon atoms, with the ratio by weight of (A) to (B) being 1:3 to 9:1.

3,875,070

WASHING AND CLEANING AGENT CONTAINING A SULFONATED POLYBUTADIENE BUILDER SALT

Ferdinand von Praun, Lippramsdorf-Freiheit, and Kurt Koswig, Marl, both of Germany, assignors to Chemische Werke Huels, A.G., Marl, Germany

Filed Dec. 6, 1972, Ser. No. 312,751

Claims priority, application Germany, Dec. 11, 1971, 2161554

Int. Cl. C11d *7/38*

U.S. Cl. 252—97 **20 Claims**

1. In a washing and cleaning composition comprising an anionic or nonionic tenside, the improvement which comprises 10–70% by weight, based on the total weight of the composition, of a builder comprising a water-soluble salt of a

17–100 molar percent sulfonated polybutadiene polymer having a molecular weight prior to sulfonation of 500–10,000.

3,875,071

ANTIMICROBIAL DETERGENT COMPOSITION CONTAINING AMINOPOLYUREYLENE RESIN

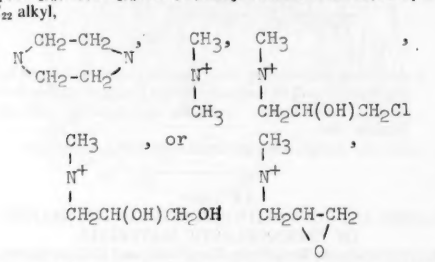
Paul Sheldon Grand, South Bound Brook, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 90,154, Nov. 16, 1970, Pat. No. 3,726,815. This application Nov. 22, 1972, Ser. No. 308,884

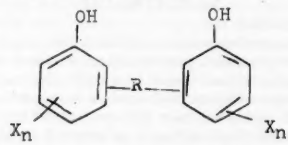
Int. Cl. C11d *3/48*

U.S. Cl. 252—106 **9 Claims**

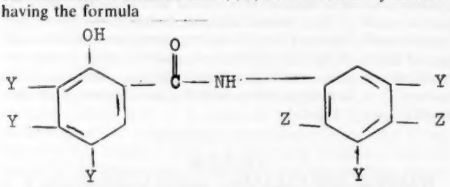
1. A detergent composition consisting essentially of from 2 to 99 percent by weight of a water-soluble organic detergent selected from the group consisting of anionic, nonionic, amphoteric, zwitterionic, polar nonionic, and cationic detergents; from 0.05 to 5 percent by weight of an aminopolyureylene resin having a molecular weight in the range of 300 to 100,000 and having the following repeating unit: $+(CH_2)_n(X)(CH_2)_nNHC(Y)NH+$ wherein X is NH, N-C_1 to C_{22} alkyl,



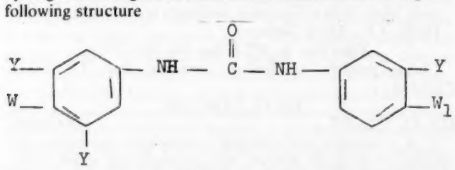
Y is O or S and *n* is 2 or 3; and from 0.05 to 5 percent by weight of an active material which is an antimicrobial agent selected from the group consisting of (A) water-soluble and water-insoluble salts of 2-pyridinethiol-1-oxide; (B) substituted bisphenols having the formula



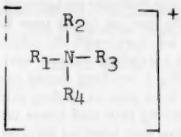
wherein X is halogen, *n* is 1–3, and R is an alkylene of 1 to 4 carbon atoms or divalent sulfur; (C) substituted salicylanilides having the formula



wherein Y is hydrogen, halogen or trifluoromethyl and Z is hydrogen or halogen; (D) substituted carbanilides having the following structure



wherein Y is hydrogen, halogen or trifluoromethyl, W is halogen or ethoxy and W_1 is hydrogen or halogen; (E) monohigher alkyl quaternary ammonium salts selected from the group consisting of C_8 to C_{22} alkyl isoquinolinium halides, C_8 to C_{22} alkyl pyridinium halides and salts having the formula



wherein R_1 is C_8 to C_{22} alkyl, R_2 and R_3 are each C_1 to C_3 alkyl, R_4 is C_1 to C_3 alkyl or benzyl, and A is selected from the group consisting of chlorine, bromine, iodine and methosulfate; (F) 5,7-diiodo-8-hydroxyquinoline; (G) 1,6-di-(4'-chlorophenyldiguanado) hexane and (H) 5-chloro-2(2,4-dichlorophenoxy) phenol.

3,875,072

PIPERAZINE AND ALKANOLAMINE ACCELERATOR FOR EPOXY CURING

Harold George Waddill, Austin, Tex., assignor to Jefferson Chemical Company, Inc., Houston, Tex.

Filed Mar. 9, 1973, Ser. No. 339,608

Int. Cl. C08g *30/14, 51/84*

U.S. Cl. 252—182 **4 Claims**

1. As a composition of matter, an accelerator combination that is synergistic for accelerating the curing of a polyglycidyl ether of a polyhydric phenol cured with a polyoxyalkylenepolyamine, said accelerator combination comprising piperazine and an alkanolamine in a combined weight ratio of about 1:8 to about 1:1 piperazine to said alkanolamine.

3,875,073

MOISTURE-STABILIZED EFFERVESCENT MIXTURE

Rolf Deininger, and Erich Wolf, both of Koln, Germany, assignors to Hermes Sweeteners Ltd., Zurich, Switzerland

Filed Mar. 30, 1972, Ser. No. 239,661

Claims priority, application Germany, June 15, 1971, 2129570

Int. Cl. A23l *1/00;* **A61k** *11/02*

U.S. Cl. 252—188.3 R **3 Claims**

1. A method of inhibiting the moisture sensitivity of an effervescent mixture consisting of an acid and a compound which releases a gaseous substance when subjected to the influence of the acid in aqueous solution, said acid being selected from the group consisting of citric, tartaric, acetic, hydroxysuccinic and glutamic acids, said gas-releasing compound being an alkali bicarbonate, the amount of acid to alkali bicarbonate being in the ratio of about 10–11 parts by weight to 5 parts by weight, said method consisting of adding in admixture to said mixture a substance consisting of a water-soluble, swellable natural albumin in an amount between about 0.5 and 2 percent of the mixture.

3,875,074

FORMATION OF MICROCAPSULES BY INTERFACIAL CROSS-LINKING OF EMULSIFIER, AND MICROCAPSULES PRODUCED THEREBY

Anthony E. Vassiliades, Deerfield; David N. Vincent, Glenview, and Mabrin P. Powell, Chicago, all of Ill., assignors to Champion International Corporation, New York, N.Y.

Filed Mar. 6, 1972, Ser. No. 232,183

Int. Cl. B01j *13/02;* **B44d** *1/02, 1/44*

U.S. Cl. 252—316 **23 Claims**

1. A process for the formation of pressure-rupturable, oil-containing microcapsules, which comprises admixing:

A. a water-immiscible, oily material containing an oil-soluble, non-polymeric cross-linking agent selected from the group consisting of a polyfunctional isocyanate and an orthoester of a Group IV element; and

B. an aqueous solution of an (hydroxy-group containing,) organic, polymeric, emulsifying agent, containing a plurality of hydroxyl groups, and selected from the group consisting of polyvinyl alcohol, methyl cellulose, starch and benzyl-substituted starch,

said admixing being conducted under conditions to form an oil-in-water emulsion, wherein said oily material is dispersed in the form of microscopic emulsion droplets in an aqueous, continuous phase, said emulsifying agent aiding in the formation of said emulsion and possessing cross-linkable hydroxyl groups capable of reacting with said cross-linking agent to form a cross-linked capsule wall at the oil/water interface, reacting said cross-linking agent with said hydroxyl groups of said polymeric emulsifying agent and thereby surrounding each of said droplets with a solid, cross-linked capsule wall, said polymeric emulsifying agent being the sole co-reactant for said oil-soluble cross-linking agent.

3,875,075
CATALYST FOR THE POLYMERIZATION OF ETHYLENE AND TERMINAL OLEFINS

David E. Boone, Downers Grove, and Peter Fotis, Highland, both of Ind., assignors to Standard Oil Company, Chicago, Ill.

Filed Apr. 16, 1973, Ser. No. 351,465
Int. Cl. B01j *11/84*
U.S. Cl. 252—429 C **7 Claims**

1. A polymerization catalyst for producing polyethylene or polyethylene containing up to about ten (10) mol percent of another alpha-olefin made by a process which consists essentially of:

a. reacting at between about 25℃ and 200℃ a first material which is magnesium trichloroacetate with a second material which is a Periodic Group IVB or VB compound selected from the group consisting of titanium and vanadium tetrabromides, tetrachlorides, alkoxytribromides, and alkoxytrichlorides using more than about 5 weights of said second material for each weight of Periodic Group IVB or VB compound, calculated as the metal, on the solid part of the product of step (a);

b. separating said solid part of the product of step (a) which is a supported Periodic Group IV or VB compound; and

c. combining said supported Periodic Group IV or VB compound with an organoaluminum compound which is a trialkylaluminum, a dialkylaluminum hydride, a dialkylaluminum halide or a combination thereof in a ratio of at least 2 millimols of said organoaluminum compound per gram of said supported Periodic Group IV or VB compound.

3,875,076
SOLID CATALYSTS FOR USE FOR THE POLYMERIZATION OF OLEFINS

Daniel Durand, and Pierre Mangin, both of Martigues, France, assignors to Naphtachimie, Paris, France

Filed July 25, 1973, Ser. No. 382,456
Claims priority, application France, July 26, 1972, 72.26825
Int. Cl. B01j *11/84*
U.S. Cl. 252—429 B **12 Claims**

1. The method for producing solid catalysts which can be used in the polymerization of olefins consisting essentially of reacting at a temperature within the range of −20℃ to 150℃ an organo-magnesium compound represented by the formulae R′ Mg X and R′ Mg R′ in which R′ is a hydrocarbon group and X is a halogen, mono-halogenated hydrocarbon and a compound selected from the group consisting of derivatives of a transition metal represented by the formula $M\ X_{4-m}(OR)_m$ in which X is a halogen atom, R is an alkyl radical containing 2–8 carbon atoms, *m* is a number of from 0 to 4 and M is a metal selected from the group consisting of metals sub-groups IVa, Va and VIa of the periodic table of elements with the metal in a state of valency of at least four, and then contacting the solid magnesium and transition metal compound resulting from the previous reaction with an oxidizing compound to convert at least a portion of the transition metal to its original valence, in which the organo-magnesium compound, monohalogenated hydrocarbon, and transition metal compound are reacted in amounts such that:

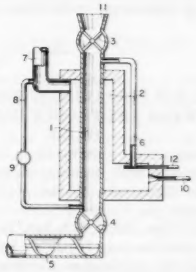
a. the ratio between the number of mono-halogenated hydrocarbon molecules and the number of organic radicals of the organo-magnesium compounds is at least 1,

b. the ratio between the number of molecules of the compounds of the transition metals and the number of organo-magnesium compound molecules is not more than 0.33.

3,875,077
METHOD OF AND APPARATUS FOR PRODUCING ACTIVATED CHARCOAL FROM WASTE TIRES

Yasuhiro Sanga, 19-26, 5-chome, Shakujiicho, Nerimaku, Tokyo, Japan

Filed Mar. 28, 1973, Ser. No. 345,513
Int. Cl. C01b *31/08*
U.S. Cl. 252—425 **2 Claims**



1. A method of producing activated charcoal comprising the steps of cutting waste tires into small pieces, adding thereto limestone in a weight ratio between 1.5 to 1 and 2.0 to 1, subjecting the mixture to heating in an atmosphere shut off from air to perfectly carbonize the tire material at a temperature below the decomposition point of the limestone to form about 35 to 40% by weight of charcoal based on the weight of said waste tires, further raising the temperature to above said decomposition point to effect calcination and to pyrolytically produce carbonic acid gas which reacts with said charcoal to reduce the charcoal weight by about 50% while activating the charcoal, and then separating the activated charcoal from the treated mixture mass.

2. A method according to claim **1** in which the heating of said mixture is provided by a combustion furnace into which fuel and air are introduced, and the carbon monoxide produced as a by-product from said reaction of carbonic acid gas with the charcoal is introduced into said combustion furnace for use as part of said fuel, and said separation of the activated charcoal from the calcined limestone is effected by air elutriation.

3,875,078
CATALYST FOR OXIDATION OF OLEFINS

Leon B. Levy, Corpus Christi, Tex., assignor to Celanese Corporation, New York, N.Y.

Division of Ser. No. 225,536, Feb. 15, 1972, Pat. No. 3,755,434. This application May 24, 1973, Ser. No. 363,450
Int. Cl. B01j *11/82*
U.S. Cl. 252—432 **6 Claims**

1. A catalyst composition of the empirical formula Mo_aCo_b. $Te_cX_dO_e$ wherein X is boron or rhodium and wherein the atomic ratio of Mo:Co:Te:X:O is such that when *a* is 100, *b* is

40–200, *c* is 0.1–7.0, *d* is either 5–75 when X is boron or 0.1–3.0 when X is rhodium, and *e* is 300–900.

3,875,079

LARGE PORE SILICAS

Donald R. Witt, Bartlesville, Okla., assignor to Phillips Petroleum, Bartlesville, Okla.

Filed July 31, 1972, Ser. No. 276,373

Int. Cl. B01j *11/36, 11/06*

U.S. Cl. 252—451 **12 Claims**

1. A method of preparing a silica-containing composition which comprises:

a. introducing an aqueous lithium silicate solution into an aqueous acid solution to form a hydrogel and a solution containing at least about 1.6 weight percent lithium monoxide;

b. aging the hydrogel;

c. washing the hydrogel to reduce the alkali metal content of the hydrogel;

d. contacting the hydrogel with a normally liquid, oxygen-containing, water soluble, azeotropic mixture-forming organic compound to separate water from said hydrogel and to form a xerogel; and,

e. recovering the xerogel as the silica-containing composition.

3,875,080

PROCESS FOR PREPARING SUPPORTED SILVER CATALYSTS FOR THE PRODUCTION OF ETHYLENE OXIDE

Herbert Bergmann; Hermann Springmann; Horst Ueberschaer, and Willi Braukmann, all of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Continuation of Ser. No. 4,743, Jan. 21, 1970, abandoned. This application July 13, 1972, Ser. No. 271,574

Claims priority, application Germany, Jan. 31, 1969, 1904642

Int. Cl. B01f *11/20*

U.S. Cl. 252—455 R **5 Claims**

1. In a process for preparing supported silver catalysts for the catalytic oxidation of ethylene to ethylene oxide, comprising forming an aqueous suspension of Ag_2O and porous support material selected from the group consisting of α-aluminum oxide and mixtures of α-aluminum oxide and silicon dioxide, said support material having pores withh diameters of about 200 – 2000 μ and a pore volume greater than 50 percent, the improvement comprising:

a. simultaneously agitating the suspension and subjecting it to a base vacuum of about 12 – 70 mm Hg in a depressurized vessel;

b. periodically allowing ventilation of the depressurized vessel to a pressure within the range of about 700 – 750 mm Hg of absolute pressure and thereby vaporizing water from the suspension without heating to form a crude catalyst mixture of Ag_2O and porous support material; and

c. reducing the crude catalyst in a gaseous stream containing hydrogen.

3,875,081

HYDROCARBON CONVERSION CATALYST

Dean Arthur Young, Yorba Linda, Calif., assignor to Union Oil Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 869,389, Oct. 24, 1969, abandoned, which is a continuation-in-part of Ser. No. 669,288, Sept. 29, 1967, abandoned. This application Aug. 16, 1972, Ser. No. 281,116

Int. Cl. B01j *11/40*

U.S. Cl. 252—455 Z **5 Claims**

1. A hydrocarbon conversion catalyst comprising a crystalline zeolite base selected from the class consisting of zeolites X, Y and L, and selectively deposited on the exterior crystalline surfaces thereof a hydrogenating component selected from the class consisting of molybdenum and tungsten and the oxides and sulfides thereof, said hydrogenating component or a precursor thereof having been composited with said zeolite base in a substantially completely undissolved, finely divided form in the presence of an aqueous medium.

3,875,082

ALKALI METAL ALKYL SULPHONATE ANTISTATIC AGENT

Hans-Werner Finck, Oberwil/Basel-Land, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Aug. 16, 1973, Ser. No. 389,014

Claims priority, application Switzerland, Aug. 22, 1972, 12404/72

Int. Cl. C09k *3/16*

U.S. Cl. 252—518 **7 Claims**

1. An antistatic agent for polymeric material having resistance to caking which comprises an alkali metal alkyl sulphonate of the formula

$$R - SO_3Me$$

wherein

Me is sodium or potassium, and

R is alkyl of 6 to 22 carbon atoms,

in the form of a finely divided powder and 1 to 30%, by weight of said sulphonate, of finely divided silicon dioxide in anhydrous or hydrate form.

3,875,083

HEAT-PRODUCING COMPOSITIONS

Justin J. Murtaugh, Guilford, Ind., assignor to The Drackett Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 72,752, Sept. 16, 1970, abandoned. This application June 27, 1973, Ser. No. 373,955

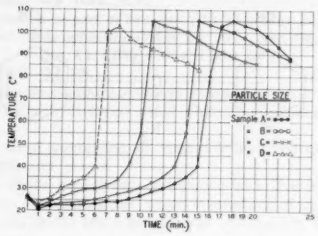
Int. Cl. C11d *7/48*

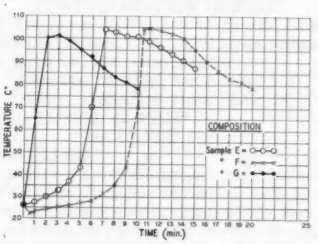
U.S. Cl. 252—535 **38 Claims**

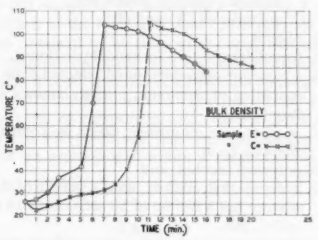
1. A heat-producing, drain-cleaning composition comprising (a) powdered aluminum having a particle size from 1 to 300 microns, in an amount from about 0.5 to about 16.7% by weight; (b) an alkali metal nitrate in an amount from about 16 to about 59% by weight; and (c) an alkali metal salt of an acid, wherein said acid has at least one hydrogen atom with an ionization constant in water not exceeding 6.0×10^{-9}, in an amount from about 36 to about 73.2% by weight, wherein said acid is a member of the group consisting of:

salicylic acid
alpha Aminoacetic acid
hydroquinone
para hydroxybenzoic acid
saccharin
carbonic acid
pyrophosphoric acid
ethylenediaminetetraacetic acid

diethylenetriaminepentaacetic acid
N-Hydroxyethylenediaminetriacetic acid







nitrilotriacetic acid
phosphoric acid

3,875,084

POLYVINYL HALIDE THIOETHER POLYMERS

Edward D. Weil, Hastings-on-Hudson, N.Y., assignor to Hooker Chemical Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 214,431, Dec. 30, 1971, abandoned, which is a division of Ser. No. 27,115, April 9, 1970, Pat. No. 3,655,618, which is a continuation-in-part of Ser. No. 651,689, July 7, 1967, abandoned. This application Aug. 10, 1973, Ser. No. 387,572

Int. Cl. C08f *27/06, 27/10, 27/18*

U.S. Cl. 260—2 EC **10 Claims**

1. A curable composition comprising

1. a crosslinking agent reactive with a phenolic ring or the phenolic OH group selected from the group consisting of sulfur dichloride, sulfur monochloride, formaldehyde, a diisocyanate, a resinous reaction product containing a formaldehyde residue, a polyepoxide and a diacid chloride and

2. a polyvinyl halide homopolymer of from about 20,000 to 100,000 number average molecular weight modified to have 0.1 to 50% of units of the formula:

$$-CH_2 - \underset{\displaystyle S - R_2}{\overset{\displaystyle |}{CH}} -$$

wherein each R_2 is independently selected from the group consisting of halogen substituted, alkyl substituted of 1 to 18 carbon atoms, monocyclic aryl substituted of 6 to 18 carbon atoms, alkylaryl substituted of 7 to 18 carbon atoms, arylalkyl substituted of 7 to 18 carbon atoms, nitro substituted, and unsubstituted carbocyclic hydroxy aryl of from 6 to 24 carbon atoms.

3,875,085

PROCESS OF MAKING AMPHOTERIC POLYMERIC COMPOSITIONS FROM SNAKE-CAGE RESINS

Brian Alfred Bolto, Mitcham, Australia, assignor to ICI Australia Limited, Melbourne, Victoria and Commonwealth Scientific and Industrial Research Organization, Campbell, Australian Capital Territory, both of, Australia

Filed Oct. 9, 1973, Ser. No. 404,208

Claims priority, application Australia, Oct. 11, 1972, 798/72

Int. Cl. C08f *1/18;* **C08j** *1/34*

U.S. Cl. 260—2.1 R **4 Claims**

1. A process of making an amphoteric polymeric composition which process comprises impregnating a crosslinked polymeric bead containing ionogenic groups or organic precursors thereof, with a monomer containing an ionogenic group of opposite charge to the ionogenic groups of the polymeric bead, or organic precursors of the ionogenic group thereof, wherein the crosslinked polymeric bead and the monomer are not of opposite charge; secondly polymerising the monomer in situ to form a snake-cage resin and thirdly treating the snake-cage resin to convert any organic precursors to ionogenic groups to form an amphoteric polymeric composition, said crosslinked polymeric bead being chosen from the group consisting of polytriallylamine and poly(N-lower alkyl-, or N-benzyl-N,N-diallylamine) crosslinked with N,N,N′,N′-tetra allyl-1,6-diaminohexane or a crosslinked polyvinylbenzyl-dialkylamine, and crosslinked poly(lower alkyl acrylates), crosslinked polyacrylamide, crosslinked poly(aminoethyl acrylate) and crosslinked polymethacrylamide; and the monomer being chosen from the group consisting of lower alkyl acrylates, acrylamide, aminoethyl acrylate, methacrylamide, diallylamine, its N-alkyl- and N-benzyl analogues, and vinylbenzyldialkylamine, the molar ratio of basic ionogenic groups or organic precursor thereof to acidic ionogenic groups or organic precursor thereof being in the range from 10 : 90 to 90 : 10.

3,875,086

URETHANE CONTAINING MONOHYDRIC POLYETHER CHAIN STOPPERS

Bobbie Joe Ramey, and Michael Cuscurida, both of Austin, Tex., assignors to Jefferson Chemical Company, Inc., Houston, Tex.

Filed Aug. 10, 1973, Ser. No. 387,435

Int. Cl. C08g *22/46, 27/16*

U.S. Cl. 260—2.5 AM **13 Claims**

1. A solid polyurethane elastomer prepared by simultaneously mixing and catalytically reacting, at an isocyanate index of from about 0.9 to about 1.4, an organic polyisocyanate A-component with a B-component comprising a polyether polyol and from 0.1 wt. percent to about 50 wt. percent of the B-component of a monohydroxy polyether chain stopper having a hydroxyl number of from about 20 to about 112 prepared by reacting a low molecular weight monohydroxy initiator with propylene oxide or propylene oxide and ethylene oxide where said propylene oxide comprises at least about 50

percent by weight of the oxide added to said monohydroxy initiator.

3,875,087

MULTICELLULAR POLYMERS

Max Gruffaz, La Mulatiere, and Bernard Rollet, Lyon, both of France, assignors to Rhone-Poulence S.A., Paris, France

Filed Apr. 23, 1974, Ser. No. 463,249

Claims priority, application France, Apr. 26, 1973, 73.15175

Int. Cl. C08g *53/08*

U.S. Cl. 260—2.5 N **11 Claims**

1. Process for preparing a multicellular polymer which comprises heating, at a temperature from 100° to 300°C, maleic anhydride and a polyaldimine of the general formula

$$A\,(N=CH-G)_n \qquad (I)$$

in which G represents a monovalent organic radical which contains less than 35 carbon atoms and at least one aromatic or heterocyclic ring in the α-position to the imine group in formula (I), A represents an organic radical of valency n which contains less than 50 carbon atoms and at least one aromatic or heterocyclic ring in the α-position to the imine group in formula (I), and *n* represents a number at least equal to 2.

3,875,088

PENCIL SHEATH COMPOSITIONS

Irving J. Arons, Peabody; Robert Eller, Boston, and Richard E. Merrill, Wakefield, all of Mass., assignors to Hasbro Industries, Inc., Pawtucket, R.I.

Continuation-in-part of Ser. No. 163,303, July 16, 1971, abandoned. This application Apr. 6, 1973, Ser. No. 348,664

Int. Cl. B43k *19/14*; **C08f** *47/10*; **C08h** *17/18*

U.S. Cl. 260—2.5 H **16 Claims**

1. A composition for extrusion around a marking core to form a sharpenable sheath, the composition consisting essentially of, by weight, approximately 50 to 75% of an extrusion-grade thermoplastic resin binder having a Vicat softening point above about 180°F., approximately 20 to 40% of fibrous filler particles selected from the group consisting of cellulose and leather, the binder/filler ratio being approximately 1.5 to 3.0, and approximately 0.5 to 15% of a substantially water insoluble metallic soap.

3,875,089

PROCESS FOR THE MANUFACTURE OF DISPERSIONS OF THERMOSETTING PHENOLIC RESIN REACTION PRODUCTS

Heinz-Bernhard Hofel; Hans-Joachim Kiessling, both of Hamburg, and Fred Lampert, Barsbuttel, Achtern Barg, all of Germany, assignors to Hoechst Aktiengesellshaft, Frankfurt, Germany

Filed June 18, 1973, Ser. No. 370,771

Claims priority, application Switzerland, Sept. 19, 1972, 13675/72; June 19, 1972, 9197/72

Int. Cl. C08b *21/32*; **C08g** *37/14*

U.S. Cl. 260—14 **7 Claims**

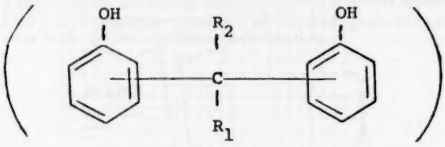
1. Process for the manufacture of a water-dilutable, aqueous dispersion of a thermosetting reaction product containing an emulsifier and a protective colloid which comprises

a. warming an aqueous mixture of

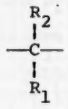
1. a substituted phenol selected from the group consisting of

A. a substituted phenol having one phenolic hydroxyl group and from 1 to 4 substituents on the phenol nucleus and having at least one ring carbon atom of the phenol available for reaction with formaldehyde, and which substituted phenol has a speed of reaction which is 40 to 150% of the speed of reaction of the unsubstituted phenol, and

B. a dihydroxyphenylalkane of the general formula



wherein R_1 and R_2 are identical or different, and each of R_1 and R_2 denote hydrogen or aliphatic group of the formula C_nH_{2n+1} wherein *n* is 1 to 5, with the limitation that the substituent



has to be on an ortho or para position relative to the phenolic hydroxyl groups and

C. mixtures of (A) and (B),

2. phenol,

3. formaldehyde or a formaldehyde donor,

4. a basic nitrogen compound selected from the group consisting of ammonia, primary amines and secondary amines,

5. a non-ionic emulsifier which is compatible with phenolic resin,

6. polyvinyl alcohol, and

7. hydroxyethylcellulose, until a sample of the reaction mixture has a B-time of 30 seconds to 10 minutes at 160°C, and

b. while stirring, cooling the mixture from step (a), said process being further characterized in that the mixture contains the substituted phenol (1) and the phenol (2) in a ratio such that the average functionality of the sum of these phenolic compounds (1) and (2) relative to formaldehyde is between 2.1 and 2.8, and the amount of formaldehyde (3) in the mixture is so chosen that the molar ratio of the total sum of formaldehyde (3) to the sum of the phenolic components (1) and (2) ranges from about 1.0 and 1.4 to 1,

the content of the basic nitrogen component (4) in the mixture ranges from about 5 to 50 mol percent relative to the total weight of the phenolic components (1) and (2), the content of the non-ionic emulsifier (5) in the mixture ranging from 5 to 25% by weight relative to the total weight of the phenols (1) and (2),

the weight ratio of polyvinyl alcohol (6) relative to the hydroxyethyl cellulose (7) ranging from about 2 to 1 to 4 to 1, and

the sum of the weights of the polyvinyl alcohol (6) and hydroxyethyl cellulose (7) in the mixture ranging from about 5 to about 25% by weight relative to the total weight of the phenol components,

the amount of water in the mixture, including added water and water of reaction, ranging from 30 to 60% by weight, relative to the weight of the total mixture.

3,875,090
IMPACT AND ABRASION RESISTANT COATING COMPOSITION

Stanley S. Levy, North Caldwell, N.J., assignor to N L Industries, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 363,732, May 24, 1973, abandoned. This application May 22, 1974, Ser. No. 472,078
Int. Cl. C08g *41/04*; **C09d** *3/72*
U.S. Cl. 260—22 TN **20 Claims**

1. A curable coating composition comprising a mixture of:
a. a partially hydrolyzed vinyl chloride-vinyl acetate copolymer;
b. an alkyd containing at least 1% hydroxyl groups by weight; and
c. a urethane prepolymer terminated with free isocyanate groups comprising the reaction product of an organic polyisocyanate and a polyol ester of ricinoleic acid.

3,875,091
SYNTHETIC POLYMER DISPERSIONS AND PROCESS FOR PREPARATION THEREOF

Hideyoshi Tsugukuni, Osaka; Satoshi Tanaka, Nishinomiya, and Mitsuhiro Matsuda, Osaka, all of Japan, assignors to Dai Nippon Toryo Co., Ltd., Osaka, Japan

Filed Dec. 26, 1972, Ser. No. 318,625
Claims priority, application Japan, June 25, 1971, 46-046166; July 13, 1972, 47-070287
Int. Cl. C08f *19/04*
U.S. Cl. 260—23 EM **10 Claims**

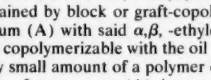
1. A dispersion of a synthetic polymer dispersed stably in an oil medium, which comprises (A) an oil medium being selected from the group consisting of natural oils, blow oils, and partially and thermally polymerized natural oils, said oil medium having an iodine value of at least 80, said oil medium being capable of dissolving an α,β, -ethylenically unsatuated monomer but incapable of dissolving a polymer formed by polymerization of the monomer, and (B) a polymer mixture component obtained by block or graft-copolymerizing a part of the oil medium (A) with said α,β, -ethyleneically unsaturated monomer copolymerizable with the oil medium (A) and including a very small amount of a polymer of said monomer the weight ratio of component (A) / component (B) being from 25/75 to 95/5, with said dispersion containing disperse particles of an average size within a range from 0.1 to 10 microns.

3,875,092
ACRYLATE RUBBER VULCANIZABLE COMPOSITIONS

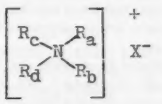
Roger E. Morris, Cuyahoga Falls, Ohio, assignor to The B. F. Goodrich Company, New York, N.Y.

Filed Sept. 17, 1973, Ser. No. 397,991
Int. Cl. C08f *37/00*
U.S. Cl. 260—23 AR **9 Claims**

1. A composition comprising (1) an acrylate rubber consisting essentially of (a) from about 40 percent to about 99.8 percent by weight of an acrylate of the formula



wherein R′ is selected from the group consisting of an alkyl radical containing 1 to 18 carbon atoms, an alkoxyalkyl, an alkylthioalkyl, and a cyanoalkyl radical containing 2 to about 12 carbon atoms, (b) from about 0.1 percent to about 30 percent by weight of a halogen-containing monomer selected from the group consisting of halogen-containing vinylene hydrocarbons and halogen-containing vinyl monomers having the halogen group at least two carbon atoms removed from an oxygen atom; (c) from about 0.1 percent to about 20 percent by weight of a carboxylcontaining monomer, and (d) up to 35 percent by weight of a copolymerizable monomer containing a terminal vinylidene group, and (2) as the curative, from about 0.5 part to about 25 parts by weight based on 100 parts by weight of the rubber, of a quaternary ammonium salt of the formula



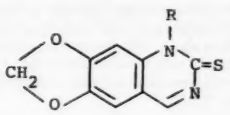
wherein R_a, R_b, R_c and R_d are hydrocarbon radicals selected from the group consisting of alkyl, aryl, alkaryl and aralkyl radicals containing 1 to 18 carbon atoms, or wherein two or three of the R_a, R_b, R_c and R_d radicals form with the nitrogen atom a heterocyclic structure containing 3 to 8 carbon atoms selected from the group consisting of C, N, O and S atoms, at least two of which are C; and X is an anion selected from the group consisting of $RCOO^-$, $H_2BO_3^-$, $HPO_4^=$, $H_2PO_4^-$, HO^-, $ROPO_3H^-$, $(RO)_2PO_2H$ and an alkyl phenoxy poly(ethyleneoxy)ethyl phosphate anion, where R is an alkyl or alkaryl radical containing 1 to 18 carbon atoms.

3,875,093
1-SUBSTITUTED-6,7-METHYLENEDIOXY-QUINOZALIN-(1H)-THIONES

George A. Cooke, Denville, and William J. Houlihan, Mountain Lakes, both of N.J., assignors to Sandoz-Wander, Inc., Hanover, N.J.

Continuation of Ser. No. 141,011, May 6, 1971, abandoned. This application Mar. 22, 1973, Ser. No. 343,817
Int. Cl. C07d *51/48*
U.S. Cl. 260—251 QB **2 Claims**

1. A compound of the formula



wherein
R is alkyl of 1 to 5 carbon atoms, cycloalkyl of 3 to 6 carbon atoms or cycloalkylalkyl of 4 to 7 total carbon atoms in which cycloalkyl is of 3 to 6 carbon atoms and alkyl is of 1 to 3 carbon atoms.

3,875,094
RADIATION CURABLE POLYESTER

Siegfried Herman Schroeter, Schenectady, and Ona V. Orkin, Latham, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 22, 1974, Ser. No. 444,860
Int. Cl. C08h *9/06*
U.S. Cl. 260—28 **6 Claims**

1. A solventless UV curable polyester composition having a viscosity of from 600 centipoises to 3000 centipoises and containing the following essential ingredients by weight:
A. 20 to 40% of a vinyl aromatic material selected from styrene, vinyl toluene, tert-butylstyrene and mixtures thereof,
B. 80 to 60% of an unsaturated polyester reaction product of (i) a glycol and (ii) an aliphatically unsaturated organic dicarboxylic acid, where
i. is a glycol selected from the class consisting of
a. a mixture of 20–60 mole percent of neopentyl glycol and 40–80 mole percent of a member selected from propylene glycol, ethylene glycol and a mixture thereof, and

b. a mixture of (a) and 1 to 40% by weight thereof of trimethylolpropane monoallyl ether, and

ii. is an aliphatically unsaturated organic dicarboxylic acid consisting essentially of a mixture of 50 to 65 mole percent of fumaric acid and 35 to 50 mole percent of a member selected from tetrahydrophthalic anhydride, endomethylene tetrahydrophthalic anhydride and mixtures thereof,

where there is utilized in making the unsaturated polyester reaction product (B) (b) up to a 10% mole percent excess of the glycol of (i) over the aliphatically unsaturated organic dicarboxylic acid of (ii)

C. 1 to 5% based on the weight of (A) and (B) of a UV sensitizer, and

D. 0.05 to 1% based on the weight of (A), (B) and (C) of paraffin wax.

3,875,095

HOT MELT COMPOSITIONS COMPRISING ELVA AND A HYDROCARBON COPOLYMER

Koichi Yamada; Hiromi Ueki; Koichiro Masuda, all of Yamaguchi, and Katsuhiko Tasaka, Tokyo, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Apr. 11, 1974, Ser. No. 459,989

Claims priority, application Japan, Apr. 11, 1973, 48-40359

Int. Cl. C08f *37/18*

U.S. Cl. 260—28.5 AV **14 Claims**

1. A hot melt composition comprising a mixture of a resin (C) and an ethylene-vinyl acetate copolymer (D) containing about 15 to 40% by weight vinyl acetate, said resin (C) comprising the copolymerization product of 100 parts by weight of vinyl aromatic hydrocarbons (i) containing more than 25% by weight isopropenyltoluene and about 5 to 250 parts by weight of a by-product hydrocarbon fraction (ii) obtained in refining or cracking petroleum and having a boiling point ranging from about −15°C to 45°C and 4 to 5 carbon atoms, the content of said isopropenyltoluene in the sum of said vinyl aromatic hydrocarbons (i) and said by-product fraction (ii) being more than about 20% by weight, obtained in the presence of a Friedel-Crafts catalyst the weight ratio of said resin (C) to said ethylene-vinyl acetate copolymer ranging from about 20/80 to 70/30.

3,875,096

PROCESS FOR THE PREPARATION OF A STABLE SALT FORM OF A SULFONATED POLYARYLETHER SULFONE

Allen F. Graefe, Claremont; Clarence W. Saltonstall, Jr., West Covina, and William J. Schell, Manhattan Beach, all of Calif., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Mar. 20, 1974, Ser. No. 453,140

Int. Cl. C09g *1/04*

U.S. Cl. 260—29.2 N **10 Claims**

1. An improved process for the preparation of an alkali metal or ammonium salt of a sulfonated polyarylether sulfone suitable for membrane manufacture, said process minimizing degradation of the polymer and comprising:

sulfonating a polyarylether sulfone in a sulfonation inert solvent with a sulfonation reagent at a temperature of less than 5°C, the amount of sulfonation reagent being such that the ratio of the number of sulfur atoms of the sulfonating agent to the number of sulfur atoms of the sulfone is between about 0.3:1 and 6:1, and producing a precipitate of a sulfonated polyarylether sulfone and a free acid;

decanting the solvent from the reaction mixture to accomplish separation of acid and precipitate;

washing the sulfonated polymer precipitate with a cold nonsolvent liquid at a temperature of less than 5°C to effect a further removal of acid; and

thereafter, treating the sulfonated precipitate with an excess of a cold aqueous alkali selected from an alkali metal hydroxide or ammonium hydroxide at a temperature of less than 5°C to produce a stable salt of the sulfonated polyarylether sulfone.

3,875,097

IONIC VINYLAMIDE POLYMER LATEX AND MANUFACTURE OF PAPER THEREWITH

John Andrew Sedlak, 249-11 Hamilton Ave., Stamford, Conn. 06902

Filed Dec. 23, 1971, Ser. No. 211,624

Int. Cl. C08f *15/40, 45/24*

U.S. Cl. 260—29.4 UA **9 Claims**

1. An aqueous latex of a water-insoluble vinylamide polymer useful as a strengthening agent in the manufacture of paper consisting essentially of at least 60 weight percent of unsubstituted acrylamide linkages as dry strengthening components, and at least about 5 weight percent of hydrophobic vinyl linkages and at least about 2 weight percent of N-[di(C_{1-3} alkyl)aminomethyl]acrylamide linkages as components improving the adsorptivity of said polymer by cellulose fibers in aqueous suspension, said polymer containing up to about 10 weight percent of anionic linkages, the ratio among said linkages being such that the polymer is insoluble in water but is substantially autodispersible in water forming a non-creaming dispersion therein, said dispersion at 10 percent by weight polymer solids content, pH 9.5 and 25°C. having a viscosity between about 250 and 200,000 centipoises.

3,875,098

IONIC VINYLAMIDE POLYMER LATEX AND MANUFACTURE OF PAPER THEREWITH

John Andrew Sedlak, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 211,624, Dec. 23, 1971,. This application May 28, 1974, Ser. No. 473,982

Int. Cl. C08f *15/40, 45/24*

U.S. Cl. 260—29.4 UA **7 Claims**

1. A process for treating an aqueous latex of particles of a water-insoluble vinylamide dry strengthening polymer to improve the affinity of said particles for cellulose fibers in aqueous suspension, said particles containing at least 60 weight percent of unsubstituted acrylamide linkages and at least 5 weight percent of hydrophobic vinyl linkages, which consists essentially of adding to said latex 0.02 to 0.3 mol of formaldehyde per mol of acrylamide linkages in said polymer and at least a molar equivalent amount of a water-soluble di(C_{1-3} alkyl)-amine, and maintaining said latex at reaction temperature in the range of about 10°C.–40°C. at an alkaline pH until said particles have become cationic when tested at pH 4.0.

3,875,099

FREE RADICAL EMULSION POLYMERIZATION INVOLVING NOVEL INCREMENTAL ADDITION OF ACRYLIC MONOMERS TO PREPARE HIGH VISCOSITY, FREEZE-THAW STABLE DISPERSIONS

Hans-Joachim Kurth, Darmstadt; Hubert Rauch, Weiterstadt; Peter Rossberg, Seeheim Ueber Darmstadt, and Wilhelm Elser, Graefenhausen, all of Germany, assignors to Rohm GmbH, Darmstadt, Germany

Filed June 4, 1973, Ser. No. 367,044

Claims priority, application Germany, June 12, 1972, 22285150

Int. Cl. C08f *1/13, 15/40*

U.S. Cl. 260—29.6 TA **4 Claims**

1. In a method for preparing a synthetic resin dispersion by the free-radical aqueous emulsion copolymerization, in the presence of an anionic or non-ionic emulsifier, of an alkyl ester of acrylic acid or of methacrylic acid and an α,β-olefinically unsaturated mono- or di-carboxylic acid, said copolymer being formed from

1. 90 to 100 percent of monomers comprising

a. 87.5 to 99.5 percent of at least one alkyl ester of acrylic acid or of methacrylic acid;
b. 2.5 to 0.5 percent of at least one α,β-ethylenically unsaturated mono- or di-carboxylic acid; and

2. 0 to 10 percent of at least one other vinyl or vinylidene monomer copolymerizable therewith, each of said percentages being by weight of the total mixture of monomers to be polymerized;

the improvement wherein

A. at least 70 percent by weight of the total unsaturated carboxylic acid employed is added to the polymerization in amounts between 3 percent and 15 percent by weight of all monomers, including the carboxylic acid, being concurrently added;

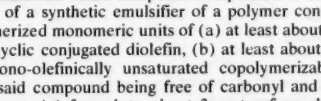
B. the addition of acid according to (A) is begun before the polymerization of more than 50 percent by weight of the total monomers (1)(a) and (2) has been initiated and is concluded before the polymerization of more than 90 percent by weight of the total monomers (1)(a) and (2) has been initiated; and 3 to 6 percent, by weight of the aqueous phase, of a further non-ionic emulsifier are added during or after the copolymerization of said monomers.

3,875,100
THERMOSETTING VINYL OR VINYLIDENE HALIDE EMULSION COPOLYMERS

Martin K. Lindemann, Greenville, S.C., assignor to Chas S. Tanner Co., Greenville, S.C.

Continuation-in-part of Ser. No. 142,406, May 11, 1971, abandoned. This application Jan. 16, 1974, Ser. No. 433,635
Int. Cl. C08f *45/24*
U.S. Cl. 260—29.6 TA **8 Claims**

1. An aqueous emulsion comprising an aqueous medium having colloidally suspended therein an emulsion copolymer of from 35% to 96.5% of vinyl chloride, from 3% to 60% of ethylene, and from 5% to 15% of monomers providing thermosetting characteristics and comprising at least 0.5% of the N-methylol functional addition product of formaldehyde with an allyl carbamate having the formula:



in which R_1 is hydrogen or methyl, R_2 is an alkylidene group containing from 2–4 carbon atoms, and n is an integer from 0–10.

3,875,101
LATEX FOR PAPER COATING UTILIZING BUTADIENE-TYRENE-ACRYLIC ACID-ACROLEIN TETRAPOLYMERS

Alastair Cameron MacLeod, 678 Hollywood Pl., Sarnia, Ontario, Canada

Filed Dec. 3, 1971, Ser. No. 204,748
Claims priority, application Canada, Dec. 11, 1970, 100375
Int. Cl. C08f *15/40, 19/08, 45/06*
U.S. Cl. 260—29.7 T **5 Claims**

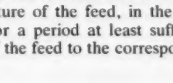
1. An aqueous latex composition suitable for use in treating fibrous materials which comprises a dispersion in an aqueous solution of a synthetic emulsifier of a polymer consisting of copolymerized monomeric units of (a) at least about 25 parts of an acyclic conjugated diolefin, (b) at least about 25 parts of a mono-olefinically unsaturated copolymerizable compound, said compound being free of carbonyl and carboxyl acid groups, (c) from 1 to about 3 parts of an olefinically unsaturated carboxylic acid and (d) from 1 to about 3 parts of an olefinically unsaturated carbonyl compound of the general formula $H(R_1)C{=}C(R_2){-}C(R_3)O$ where R_1 is a hydrogen or a C_1–C_6 monovalent hydrocarbon radical and R_2 and R_3 are hydrogen or C_1–C_2 alkyl radicals, said parts being parts by weight per 100 parts by weight of polymer.

3,875,102
POLYVINYL CHLORIDE PLASTICIZED WITH METHYL ESTERS OF ORGANIC SULFONIC ACID OLIGOMER

Alan E. Straus, El Cerrito; William A. Sweeney, Larkspur; Ralph House, El Sobrante, and Samuel H. Sharman, Kensington, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 858,097, Sept. 15, 1969, Pat. No. 3,721,707. This application July 28, 1972, Ser. No. 279,430
Int. Cl. C08f *45/46*
U.S. Cl. 260—30.8 R **2 Claims**

1. Polyvinyl chloride composition comprising polyvinyl chloride resin and a plasticizing amount of methyl ester of oligomeric sulfonic acid composition obtained by heating in the liquid phase a feed comprising at least one straight chain compound having a carbon atom content in the range from 5 to 30 selected from the group of formula

a)  ,

b. $RCH(OH)(CH_2)_zCHRSO_3H$, and
c. $RCH{=}CH(CH_2)_tCHRSO_3H$

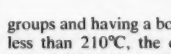
wherein x is a number in the range 0 – 3 and y is a number in the range $0 - n$, wherein n is a number which is 4 less than the number of carbon atoms in the longest straight chain of the compound containing the $-SO_3H$ group as a substituent, and wherein the several R groups are the same or different and are hydrogen or alkyl hydrocarbon radicals; said heating being at a temperature above about 110°C and below the carbonization temperature of the feed, in the substantial absence of water, and for a period at least sufficient for a significant conversion of the feed to the corresponding oligomeric disulfonic acids.

3,875,103
POLYSULPHONE POLYMER SOLUTION

Victor Jeffrey Leslie, Potters Bar, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Dec. 17, 1973, Ser. No. 425,277
Claims priority, application United Kingdom, Jan. 26, 1973, 4125/73; Jan. 26, 1973, 4126/73
Int. Cl. C08g *51/34, 51/44, 51/46*
U.S. Cl. 260—30.8 DS **10 Claims**

1. A solution for coating which comprises at least one thermoplastic amorphous aromatic polysulphone dissolved in a solvent mixture comprising (a) 70 to 85% by volume of a mixture of (i) at least one cyclic aliphatic ketone having a ring containing 5 to 7 carbon atoms and having a boiling point, at atmospheric pressure, of less than 200°C and (ii) at least one inert liquid compound containing a polar group selected from —SO—, $-SO_2-$,



groups and having a boiling point, at atmospheric pressure, of less than 210°C, the cyclic aliphatic ketone to inert liquid compound volume ratio being 70:30 to 95:5, and (b) 30 to 15% by volume of at least one dialkyl ketone having a boiling point, at atmospheric pressure, of less than 150°C, the concentration of the polysulphone being 5 to 25 g in 100 cm^3 of solvent mixture.

3,875,104

COAGULATION OF OIL-EXTENDED EMULSIONS

Frederick H. Siegele, Westport, and Robert Rabinowitz, Stamford, both of Conn., assignors to American Cyanimid Company, Stamford, Conn.

Filed Dec. 17, 1973, Ser. No. 425,419
Int. Cl. C08d 7/02
U.S. Cl. 260—33.6 AQ 6 Claims

1. A method for coagulating an oil extended, rubber latex of 3–75% styrene, 25–97% butadiene and up to 50% acrylonitrile, the total being 100%, said percentages being by weight which comprises

1. adding to said latex an anionic polymer having a molecular weight of from about 500 to 15,000,000 and containing from about 5 to 100% by weight of carboxyl groups,
2. adding to the product of step (1), a cationic polymer,
3. adding to the product of step (2), an acid and
4. recovering the resultant coagulated oil-extended rubber.

3,875,105

ERASABLE WRITING MEDIUM SUITABLE FOR USE IN BALL POINT PENS

Phillip M. Daugherty, Monrovia, Calif.; Thomas E. Palmer, Stockbridge, and Wilmot D. Tidd, Atlanta, both of Ga., assignors to Scripto, Inc., Atlanta, Ga.

Continuation-in-part of Ser. No. 751,759, Aug. 12, 1968, abandoned. This application Jan. 23, 1973, Ser. No. 326,094
Int. Cl. C08f 45/28; C08g 51/28
U.S. Cl. 260—33.2 R 13 Claims

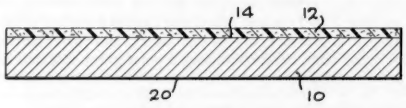
1. An erasable writing medium suitable for use in ball point pens, comprising a colorant and a matrix material capable of capturing said colorant having cohesive properties exceeding is properties to adhere to the solid members of the writing surface, said matrix material incorporated in a vehicle comprising a volitalizing component, said matrix material being a polyvinyl methyl ether having a viscosity in a 50% solid solution in toluene of 25,000 ± 2000 cps at 77°F, said volatilizing component being a solvent for said matrix material and having an evaporation rate of 3 to 15 on a relative numerical scale on which ethyl ether is assigned an evaporation rate of 1, the amount of said colorant ranging from 9.0% to 13.0% by weight; and the amount of said volatilizing component ranging from 24.0% to 29.0% by weight, the amount of said matrix ranges from 25–30% by weight.

3,875,106

ABLATION COMPOSITIONS AND COATINGS

Vito C. Lazzaro, Los Angeles, Calif., assignor to McDonnell Douglas Corporation, Santa Monica, Calif.

Continuation of Ser. No. 585,563, Oct. 10, 1966, abandoned. This application Oct. 30, 1970, Ser. No. 85,800
Int. Cl. C08g 51/10
U.S. Cl. 260—37 EP 13 Claims



1. An ablation coating composition comprising from about 15% to about 95% of an epoxy resin, from about 5% to about 75% of silica in fibrous form, and about 1% to about 10% of a boron and oxygen-containing compound calculated as boron oxide, said compound selected from the group consisting of boron oxide, borates and boric acid, by weight.

3,875,107

FLAME-RESISTANT THERMOPLASTIC MOLDINGS COMPOSITIONS AND MOLDING MADE THEREFROM

Werner Nouvertne, Krefeld, Germany; Peter Rolf Muller, Coraopolis, Pa.; Gunter Peilstocker, and Hugo Vernaleken, both of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 293,195, Sept. 28, 1972, Pat. No. 3,845,007. This application Apr. 29, 1974, Ser. No. 465,023
Claims priority, application Germany, Sept. 29, 1971, 2148598
Int. Cl. C08g 51/10
U.S. Cl. 260—37 PC 6 Claims

1. A high impact, flame resistant aromatic polycarbonate containing by weight:

a. 2–6 percent glass fibers having an average fiber length of 100 to 600 μm; and
b. an effective amount of
   i. up to 3 percent of chlorine or bromine chemically bonded to an aromatic carbon atom of said aromatic polycarbonate, and
   ii. up to 1 percent of an alkali metal salt.

3,875,108

DEEP DYEABLE, LUSTEROUS, AND FIRE-RETARDANT LINEAR POLYESTER COMPOSITION

Paul J. Koch, Mt. Freedom; Eli M. Pearce, Somerville, and Julie A. Lapham, Denville, all of N.J., assignors to Allied Chemical Corporation, New York, N.Y.

Continuation of Ser. No. 99,701, Dec. 18, 1970, abandoned. This application Nov. 24, 1972, Ser. No. 309,390
Int. Cl. C09k 3/28
U.S. Cl. 260—45.7 P 8 Claims

1. A fire retardant thermoplastic polymer composition comprising polyethylene terephthalate having incorporated therein a bromoaryl compound selected from the group consisting of hexabromobenzene, pentabromotoluene and octabromodiphenyl in an amount sufficient to provide from about 1% to about 10% by weight of bromine based on the weight of the polymer, in combination with triphenylphosphate in an amount sufficient to provide from about 0.1% to about 2% by weight phosphorus based on the weight of the polymer.

3,875,109

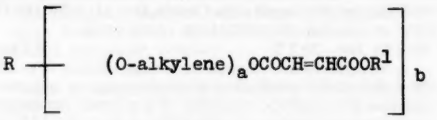
COMPOSITIONS RESISTANT TO BURNING

Brian Edward Bridgland; Derek James Rowland Massy, and Bernard Peter Stark, all of Cambridge, England, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Aug. 30, 1973, Ser. No. 392,919
Claims priority, application United Kingdom, Sept. 1, 1972, 40652/72
Int. Cl. C08d 7/10
U.S. Cl. 260—45.7 R 14 Claims

1. A composition which cures to form a product resistant to burning, comprising

i. an unsaturated ester having an average molecular weight of 250 to 10,000, of the general formula



where

a is an integer of at least 1,
b is an integer 2 to 6,
R denotes the radical, of 3 to 60 carbon atoms, of valency b remaining after removal of b alcoholic hydroxyl groups from a polyhydric alcohol or after removal of b phenolic hydroxyl groups from a polyhydric phenol, or the acyl

radical remaining after removal of b OH groups from a compound having at least b carboxyl groups,

each alkylene group contains a chain of 2 to 6 carbon atoms between consecutive oxygen atoms,

R' represents —H or the monovalent residue of an alcohol after removal of an —OH group,

ii. a polymercaptan having an average molecular weight of at most 10,000 and containing, per average molecule, two to 6 mercaptan groups, the sum of the number of the indicated ethylenic double bonds in the unsaturated ester (i) and the number of the mercaptan groups in the polymercaptan (ii) being more than 4 and at most 8, and

iii. 0.04 to 10 percent by weight of a salt or hydroxide of an alkali metal, calculated on the combined weight of the said polymercaptan and unsaturated ester.

3,875,110
STABILIZERS FOR CHLORINE-CONTAINING POLYMERS

Mohamed Roshdy Ismail, Spich, and Hans Raalf, Troisdorf, both of Germany, assignors to Dynamit Nobel AG, Cologne, Germany

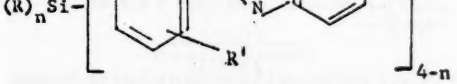
Division of Ser. No. 640,375, May 22, 1967, abandoned. This application Mar. 11, 1970, Ser. No. 23,522

Claims priority, application Germany, May 20, 1966, 50156

Int. Cl. C08f *45/62, 45/60*

U.S. Cl. 260—45.75 Z **6 Claims**

1. Composition comprising at least one chlorine-containing polymer selected from the group consisting of vinyl chloride polymers, vinylidene chloride polymers, trichloroethylene polymers, chloroprene polymers, trifluoromonochloroethylene polymers, chlorinated styrene polymers, and chlorinated acrylic polymers admixed with a stabilizing amount of at least one compound of the formula:

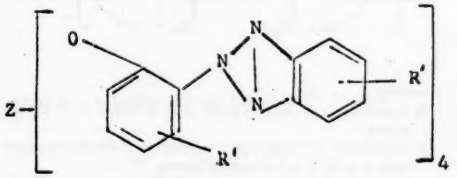


wherein R is a member selected from the group consisting of alkyl of 1-6 carbon atoms, phenyl and naphthyl;

R' is a member selected from the group consisting of hydrogen, alkyl of 1 to 6 carbon atoms, and a condensed ring forming a naphthyl group; and

n is 0, 2 or 3.

6. Composition comprising at least one chlorine-containing polymer selected from the group consisting of vinyl chloride polymers, vinylidene chloride polymers, trichloroethylene polymers, chloroprene polymers, trifluoromonochloroethylene polymers, chlorinated styrene polymers, and chlorinated acrylic polymers admixed with a stabilizing amount of at least one compound of the formula:



wherein Z is a member selected from the group consisting of silicon and tin; and

R' is a member selected from the group consisting of hydrogen, alkyl of 1 to 6 carbon atoms, and a condensed ring forming a naphthyl group.

3,875,111
CATIONIC POLYMERS OF TERTIARY, DIAMINES, BIS(CHLOROACETYL)GLYCOLS AND TRIS(N,N-DIMETHYL AMINO ALKYL)PHENOL

Minoru Tsuda; Takamitsu Yuki, and Akio Yoshida, all of Tokyo, Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 28, 1972, Ser. No. 229,825

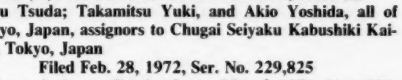
Claims priority, application Japan, Mar. 5, 1971, 46-11532; Mar. 5, 1971, 46-11533; July 28, 1971, 46-56012

Int. Cl. C08g *17/00*

U.S. Cl. 260—47 CZ **25 Claims**

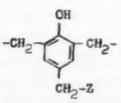
1. A cationic polymer mainly comprising:

a. a repeating unit represented by the formula



wherein A and B are respectively a divalent radical selected from a class consisting of a straight or branched alkylene, a straight or branched alkylene containing, as a part thereof, a double bond, a triple bond, or a radical $-(CH_2CH_2O)_y-CH_2CH_2-$, wherein *y* is an integer of from 1 to 20, xylylene and cyclohexylene; R_1, R_2, R_3 and R_4 each represents a lower alkyl group, or R_1 and R_2, and/or R_3 and R_4, when taken together with nitrogen atoms to which they are attached, may respectively form a heterocyclic ring; and X represents a halogen atom, and partially containing up to 10 mol percent of one or more other repeating units selected from a class consisting of:

b. a repeating unit represented by the above general formula (I) wherein A represents a polyamine residue selected from a class consisting of



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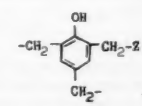

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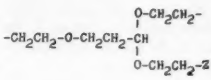

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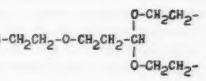
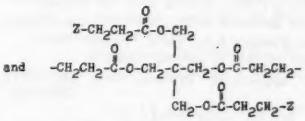


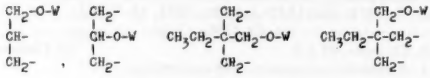
and

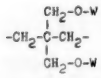


wherein Z represents

R_5 and R_6 are respectively a lower alkyl group; and B, R_1, R_2, R_3, R_4 and X are as defined in the above (a);

c. a repeating unit represented by the above general formula (I) wherein D represents a polyhydric alcohol residue containing 28.14 percent chlorine selected from a class consisting of





and a chloroacetylated glucose residue, wherein W represents $-COCH_2-$; and A, R_1, R_2, R_3, R_4 and X are as defined in the above (a); and

d. a repeating unit represented by the above general formula (I) wherein A and B are respectively as defined in the above (D) and (c), and R_1, R_2, R_3, R_4 and X are as defined in the above (a).

3,875,112

AROMATIC POLYCARBONATES WITH ALIPHATIC HYDROXYL GROUPS

August Bockmann; Dieter Margotte; Hans Rudolph, all of Krefeld-Bockum, and Hugo Vernaleken, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 19, 1972, Ser. No. 245,604

Claims priority, application Germany, Apr. 23, 1971, 2119775

Int. Cl. C08g *17/13*

U.S. Cl. 260—47 XA **14 Claims**

1. A process for the production of an aromatic polycarbonate comprising reacting phosgene with one or more compounds having at least two aromatic hydroxyl groups and with one or more compounds having one aromatic hydroxyl group with the proviso that at least one compound having one or at least two aromatic hydroxyl groups also has at least one aliphatic hydroxyl group, by interfacial condensation while maintaining the pH of the resultant reaction mixture in the range of 8 to 13.5 whereby substantially all the aliphatic hydroxyl groups remain unreacted.

3,875,113

THERMOSETTING COMPOSITIONS DERIVED FROM AN EPOXY RESIN, A POLYAMINE AND AN IMIDE

Gerard Lefebvre, and Bernard Rollet, both of Lyon, France, assignors to Rhone-Poulenc S.A., Paris, France

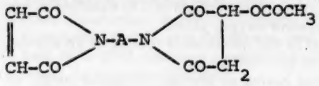
Filed Oct. 26, 1973, Ser. No. 409,935

Claims priority, application France, Oct. 31, 1972, 72.38609

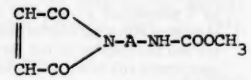
Int. Cl. C08g *30/14*

U.S. Cl. 260—47 EN **9 Claims**

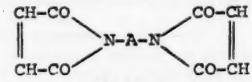
1. A heat-resistant composition which comprises an epoxy resin containing more than one 1,2-epoxy group, a polyamine containing at least two primary amine groups and also either a compound (α) of the formula:



or



or a mixture of such compounds; or a compound (α) and a bis-maleimide (β) of the formula:



in which the symbol A represents a divalent hydrocarbon radical containing at least two carbon atoms, the bis-maleimide (β) being present in an amount up to about 90 percent by weight based on the weight of (α) and (β).

3,875,114

AMIDOMETHYLENE MODIFIED AROMATIC CARBOCYCLIC POLYMERS AND METHODS FOR MAKING THE SAME

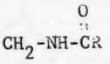
Roger T. Swiger, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed June 18, 1973, Ser. No. 370,816

Int. Cl. C08f *7/02*; **C08g** *17/13*

U.S. Cl. 260—47 XA **4 Claims**

1. An aromatic carbocyclic resinous polymer having chemically combined phenyl radicals to which are directly attached from 0.01 to 4



groups per phenylene radical where R is either methyl or CH_2=CH—.

3,875,115

LINEAR POLYIMIDES PREPARED FROM BIS-IMIDES, TERTIARY PHOSPHINES AND DIALDEHYDES

Maurice Balme, Sainte-Foy-les-Lyon, France, assignor to Rhone-Poulence S.A., Paris, France

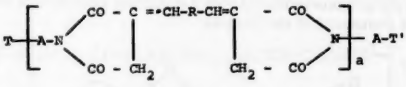
Filed Nov. 6, 1973, Ser. No. 413,245

Claims priority, application France, Nov. 9, 1972, 72.39730

Int. Cl. C08g *20/32*

U.S. Cl. 260—47 UA **12 Claims**

1. A linear polyimide which consists essentially of a product of the general formula:



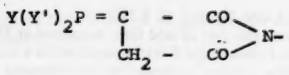
in which:

A represents a divalent organic radical with 2 to 30 carbon atoms,

R represents a simple valency bond or a divalent organic radical with 1 to 24 carbon atoms,

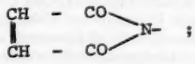
a represents a number at least equal to 1 and

T and T′, which may be identical or different, each represents a radical selected from a radical of the formula:

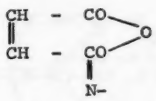


(T_1)

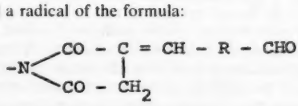
in which Y represents a hydrogen radical with 4 to 12 carbon atoms, and each of the symbols Y′, which may be identical or different, represents a hydrocarbon radical with 1 to 12 carbon atoms or Y and Y′ together form a divalent hydrocarbon radical with 2 to 12 carbon atoms; a maleimido radical of the formula:



an isomaleimido radical of the formula:



and a radical of the formula:



(T_2)

in which R is as defined above.

3,875,116

POLYETHERIMIDES

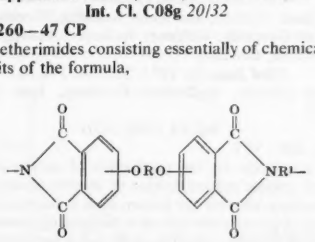
Darrell R. Heath, Overland Park, Kans., and Joseph G. Wirth, Ballston Lake, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 319,327, Dec. 29, 1970, , which is a continuation-in-part of Ser. No. 108,151, Jan. 20, 1971. This application Mar. 8, 1974, Ser. No. 449,253

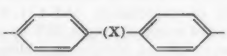
Int. Cl. C08g *20/32*

U.S. Cl. 260—47 CP **2 Claims**

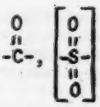
1. Polyetherimides consisting essentially of chemically combined units of the formula,



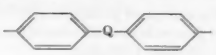
where R is a divalent organic radical of the formula



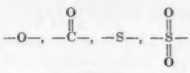
and X is a member selected from the class consisting of



and —S—, and R^1 is a divalent organic radical selected from the class consisting of (a) aromatic hydrocarbon radicals having from 6–20 carbon atoms and halogenated derivatives thereof, (b) alkylene radicals and cycloalkylene radicals having from 2–20 carbon atoms, $C_{(2-8)}$ alkylene terminated polydiorganosiloxane, and (c) divalent radicals of the formula,



where Q is a member selected from the class consisting of



and $-C_xH_{2x}-$, and x is a whole number from 1 to 5 inclusive.

3,875,117

PROCESS FOR IMPARTING STABILITY TO POLYACETALS

Jacob Ackermann, Gorla Minore; Pierino Radici, Turate, and Pietro Erini, Olgiate Olona, all of Italy, assignors to Societa Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Dec. 27, 1972, Ser. No. 318,970

Claims priority, application Italy, Dec. 27, 1971, 32947/71; Sept. 20, 1972, 29424/72

Int. Cl. C08g *1/26, 3/00*

U.S. Cl. 260—67 R **23 Claims**

1. Process for stabilising polyacetals of a molecular weight above 10,000 containing residues of one or more aldehydes with or without residues of non-aldehydic co-monomers by reaction of the terminal hydroxyl groups of the macromolecule with a blocking reagent, wherein the improvement comprises bringing said reagent into contact with the polyacetal suspended in a reaction medium which is liquid under the working conditions, the said reaction medium comprising at least one substance which is inert vis-a-vis the other constituents of the reaction mixture, is not solvent vis-a-vis the polymer and is liquid under the reaction conditions, and at least one substance which is solvent with respect to the polymer and the reagent and which is liquid under the reaction conditions, the said solvent and non-solvent substances being completely miscible under the conditions in which reaction takes place, but immiscible or partially miscible at temperatures substantially below the reaction temperatures, said blocking reagent being selected from anhydrides of carboxylic acids, isocyanates, isothiocyanates, orthoesters, and ethers, the ratio by weight of solvent to non-solvent substances being maintained at between approximately 0.05 : 1 to 1 : 1, a ratio by weight of polyacetal to the total of solvent and non-solvent substances of 1 : 0.5 to 1 : 10 being maintained.

3,875,118

THERMOPLASTIC POLYURETHANES AND A TWO-STAGE PROCESS FOR THEIR PREPARATION

Ernst Meisert, Leverkusen, and Wilhelm Goyert, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Sept. 26, 1973, Ser. No. 400,782

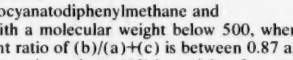
Claims priority, application Germany, Oct. 3, 1972, 2248382

Int. Cl. C08g *22/06, 53/00, 53/16*

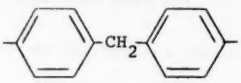
U.S. Cl. 260—75 NP **11 Claims**

1. Polyurethane elastomers which are the reaction products of

a. a polyol with an average molecular weight of between 900 and 5300,
b. 4,4'-diisocyanatodiphenylmethane and
c. a diol with a molecular weight below 500, wherein the equivalent ratio of (b)/(a)+(c) is between 0.87 and 0.97 and (a) contains at least 40% by weight of a urethane of the formula



where:
R represents a divalent group obtained by removal of the hydroxyl groups from a diol having a molecular weight between 700 and 1750 and
Q represents a divalent aliphatic, cycloaliphatic, araliphatic or aromatic group containing 2 to 20 carbon atoms, with the proviso that Q is not



3,875,119
PRODUCT AND PROCESS OF PRODUCING BIAXIALLY ORIENTED INSULATING FILM OF POLYETHYLENE-2,6-NAPHTHALATE

Hiroshi Aoki, 2-20, Nakamachi, Koganei-shi, Tokyo; Sakae Shimotsuma, 23-12, 6-chome, Higashi-rinkan, Sagamihara-shi, Kanagawa-ken; Masanori Masuda, 1200-6, Kamitsuruma, Sagamihara-shi, Kanagawa-ken; Takeo Asai, 16-25, 6-chome, Seishin, Sagamihara-shi, Kanagawa-ken, and Hujio Matsumoto, 7-12, 5-chome, Seishin, Sagamihara-shi, Kanagawa-ken, all of Japan

Continuation-in-part of Ser. No. 210,541, Dec. 21, 1971, abandoned. This application Feb. 15, 1974, Ser. No. 443,035
Claims priority, application Japan, Dec. 22, 1970, 45-116402; Oct. 2, 1971, 46-77299
Int. Cl. C08g *17/08;* **B29d** *7/24*
U.S. Cl. 260—75 T **5 Claims**

3. A process for the preparation of a biaxially oriented and post-heat-treated polyethylene-2,6-naphthalate insulating film composition, which comprises biaxially stretching an unstretched polyethylene-2,6-naphthalate film composition consisting essentially of polyethylene-2,6-naphthalate in which at least 90 mol percent of the structural units are ethylene-2,6-naphthalate units, and at most 10 mol percent of the structural units are units derived from a comonomer or comonomers having a divalent, ester-forming functional group or groups, at a stretch ratio in the widthwise direction within a range of from about 3 to about 4 times based on the original width of the unstretched film, and the stretch ratio in the lengthwise direction is within a range of from about 3 to about 4 times based on the original length of the unstretched film, with a proviso that the stretch ratio in the widthwise direction is 1 – 4/3 times to the stretch ratio in the lengthwise direction, the stretching in the widthwise direction being conducted at 115° – 150°C. and the stretching in the lengthwise direction being conducted at 120° – 160°C., and then subjecting the biaxially stretched film to the post-heat-treatment at 215° – 240°C. under such conditions as will not allow a shrinkage greater than 10 % to thereby obtain a biaxially oriented and post-heat-treated film wherein the elongation at breakage of the resulting film is not less than 15 %, when said film is subjected to further heat treatment at 200°C. for 200 hours under such conditions as will allow free shrinkage of the film; and the thickness-direction refractive index $[n_z]$ of said biaxially oriented and post-heat-treated film, measured at 20°C. by Abbe's refractometer, with use of a ray of a wavelength of 589 mμ, is within a range expressed by the following formula:

$$1.499 \leqq [n_z] \leqq 1.520$$

and the intrinsic viscosity $[\eta]$ of said film, measured at 35°C. in a mixed solvent of phenol: 2,4,6-trichlorophenol at a weight ratio of 6:4, is within a range expressed by the following formula:

$$0.48 \leqq [\eta] \leqq 0.70$$

with a proviso that above $[n_z]$ and $[\eta]$ satisfy the following condition:

$$[n_z] \leqq 0.3 \times [\eta] + 1.361$$

3,875,120
TRANSPARENT POLYAMIDES FROM 1,3-BIS-(AMINOMETHYL)CYCLOHEXANE

Ludwig Brinkmann, Frankfurt am Main, and Walter Herwig, Neuenhain, Taunus, both of Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt, Germany

Filed May 24, 1973, Ser. No. 363,415
Claims priority, application Germany, May 27, 1972, 2225938
Int. Cl. C08g *20/20*
U.S. Cl. 260—78 R **15 Claims**

1. A polyamide of the formula

$$R_3—HN—R_1—NH—CO—R_2—CO\ ]_x\ R_4$$

wherein:
R_1 represents a cyclohexane-1,3-bis-methylenyl radical, with from 0 to 50 mol percent of this radical being replaced by a cyclo-hexane-1,4-bis-methylenyl radical, and at least one, straight chain, bivalent aliphatic hydrocarbon radical containing from 4 to 20 carbon atoms, the proportion of the aliphatic hydrocarbon radical or radicals being from 5 to 90 mol percent, based on the sum of the cyclo-hexane-bis-methylenyl- and aliphatic hydrocarbon radicals,
R_2 represents at least one bivalent aromatic hydrocarbon radical containing from 5 to 18 carbon atoms, and at least one bivalent aliphatic saturated hydrocarbon radical containing from 3 to 18 carbon atoms, the proportion of the aliphatic radical or radicals being from 10 to 90 mol percent, based on the sum of the aromatic and aliphatic radicals,
R_3 represents H or $OC—R_2—COOH$ and
R_4 represents OH or $NH—R_1—NH_2$, and in which
x indicates the degree of polymerization, measured as the reduced specific viscosity within the range of from 1.0 to 2.5 dl/g, determined in a 1 percent solution in phenol/tetrachloroethane in a weight ratio of 60:40 at 25°C.

3,875,121
ACTIVATED ANIONIC POLYMERIZATION OF LACTAMS

Bert Brassat, Krefeld, and Klaus Reinking, Wermelskirchen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed June 22, 1973, Ser. No. 372,501
Claims priority, application Germany, June 23, 1972, 2230732
Int. Cl. C08g *20/18*
U.S. Cl. 260—78 L **12 Claims**

1. In a process for the production of polyamides by the activated anionic polymerization of lactams having at least 5 ring members wherein the lactam melt is polymerized in the presence of an activator and of a catalytically active solution of an alkali metal or alkaline earth metal lactamate in a solvent mixture selected from the group consisting of (1) a mixture of α-pyrrolidone and of maximal 50% by weight of ε-caprolactam; (2) a mixture of α-pyrrolidone and of maximal 7% by weight of lauriclatam; and (3) a mixture of α-pyrrolidone and of maximal weight 38% by weight of capryllactam, the improvement comprising adding 0.1 to 25% by weight of at least one carboxylic acid N-alkyl-amide which is liquid at room temperature to said catalytically active solution

which in turn is added to said lactam melt containing the activator.

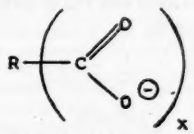
3,875,122

CROSS-LINKING EPIHALOHYDRIN POLYMERS

Joseph E. Mirolli, Beaumont, Tex., assignor to Hercules Incorporated, Wilmington, Del.

Filed May 15, 1973, Ser. No. 360,692
Int. Cl. C08g *23/20*
U.S. Cl. 260—78.4 D 8 Claims

1. The process of cross-linking a polymer of an epihalohydrin which comprises heating said polymer in the presence of from about 0.0025 gram mole to about 1.0 gram mole per 100 grams of polymer of at least one agent which yields a polycarboxylate polyanion having the formula



where R is a radical selected from the group consisting of phenylene, alkylene, cycloalkylene and the hydrocarbon radical remaining after the removal of the carboxylic acid groups from the dimer and trimer acids of diunsaturated fatty acids and *x* is an integer from 2 to 4.

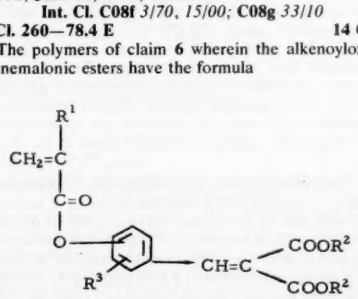
3,875,123

POLYMERS AND COPOLYMERS BASED ON ALKENOYL-OXYBENZYLIDENE-MALONIC ESTERS AS UV-ABSORBERS AND PLASTICS STABILIZED THEREWITH

Dieter Margotte, Krefeld-Bockum; Burkhard Lachmann, Krefeld-Uerdingen; Hugo Vernaleken, Krefeld; Hans Rudolph, Krefeld, and Wolfgang Cohnen, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed June 22, 1973, Ser. No. 372,724
Claims priority, application Germany, June 28, 1972, 2231531; June 28, 1972, 2231532
Int. Cl. C08f *3/70*, *15/00*; C08g *33/10*
U.S. Cl. 260—78.4 E 14 Claims

7. The polymers of claim 6 wherein the alkenoyloxybenzylidenemalonic esters have the formula



wherein

R^1 is hydrogen or alkyl with C_1 to C_4;

R^2 is alkyl with C_1 to C_{12} or cycloalkyl; and

R^3 is hydrogen, alkyl with C_1 to C_8, alkoxy with C_1 to C_8 or halogen.

3,875,124

N-TERT-ALKYLAMINO PYRROLIDINYLTHIOCARBONYL SULFIDES

Gene R. Wilder, Medina, Ohio, assignor to Monsanta Company, St. Louis, Mo.

Division of Ser. No. 44,658, June 8, 1970, Pat. No. 3,709,905. This application Oct. 27, 1972, Ser. No. 301,649
Int. Cl. C08d *9/00*; C08c *11/40*
U.S. Cl. 260—79.5 B 1 Claim

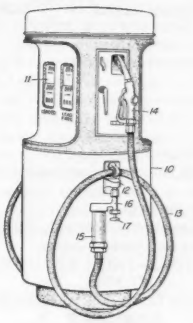
1. A process of accelerating the vulcanization of a sulfur-vulcanizable diene rubber which comprises heating rubber and sulfur with an accelerating amount of tertiary-butylamino-1-pyrrolidinylthiocarbonyl sulfide.

3,875,125

SORBENT FOR HEAVY METALS

Darrell Duayne Whitehurst, Titusville, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 270,913, July 12, 1972, Pat. No. 3,785,968. This application Aug. 13, 1973, Ser. No. 387,873
Int. Cl. C08d *11/02*, *13/30*; C08f *27/06*
U.S. Cl. 260—79.5 R 6 Claims



1. A cross-linked polystyrene resin modified by the presence therein of between about 2 to 30 weight percent of chemically bound sulfur having an oxidation state of less than +6 in combination with between about 5 to 50 weight percent of a salt of a metal selected from the group consisting of mercury, antimony, tin, copper and silver.

3,875,126

PRODUCTION OF ALPHA-OLEFIN POLYMERS

Kijuro Tashiro; Masuzo Yokoyama; Sadao Kitagawa, and Shoichi Masukawa, all of Ibaraki-ken, Japan, assignors to Mitsubishi Petrochemical Company Limited, Tokyo, Japan

Filed Jan. 12, 1973, Ser. No. 323,080
Claims priority, application Japan, Jan. 14, 1972, 47-5891
Int. Cl. C08f *15/04*, *19/02*, *3/02*
U.S. Cl. 260—88.2 R 13 Claims

1. A process for producing α-olefin polymers which comprises contacting an α-olefin with a catalyst system prepared by combining

I. a solid composition prepared by milling titanium trichloride, obtained by reducing titanium tetrachloride with metallic titanium, in the presence of, as modifier,,

1. a halohydrcarbon selected from the group consisting of dichloropropanes, dibromopropanes, dichlorobutanes, 1,5-dichloropentane, hexachlorocyclopentadiene, benzyl chloride and hexachlorobenzene,

2. silicon tetrachloride or

3. tellurium tetrachloride,

II. an organoaluminum compound and

III. a cycloheptatriene compound selected from the group consisting of tropylchlorocyclopentene and methoxyethyltropylether.

3,875,127

ACRYLONITRILE POLYMERS WITH ANTI-STATIC PROPERTIES

Eduard Radlmann, and Gunther Nischk, both of Dormagen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

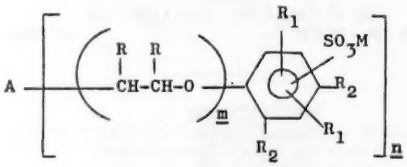
Filed Apr. 13, 1973, Ser. No. 350,959

Claims priority, application Germany, Apr. 14, 1972, 2217974

Int. Cl. C08f *3/76, 45/58*

U.S. Cl. 260—85.5 R **6 Claims**

1. A polymer composition comprising an acrylonitrile polymer and as an antistatic agent therefor for 1 to 20 percent by weight of the total solids content of at least one compound having the formula



(I)

in which

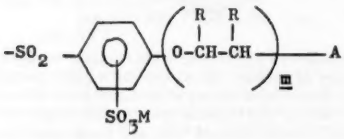
m is an integer of from 1 to 150;

M is an alkali metal, an ammonium radical, or an alkylammonium radical;

R is a hydrogen or methyl;

R_1 is hydrogen, lower alkyl radical with 1 to 6 carbon atoms, fluorine, chlorine, bromine or iodine;

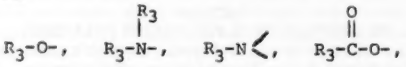
R_2 is hydrogen, $-NH_2$, $-NO_2$, $-CN$, $-CF_3$, $-Cl$ or



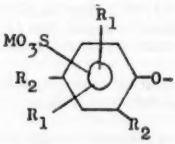
(II)

in which R, M and *m* are defined as above; and

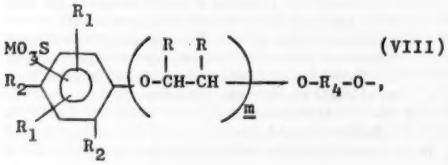
A is



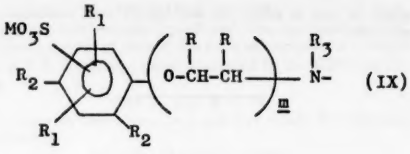
(III) (IV) (V) (VI)



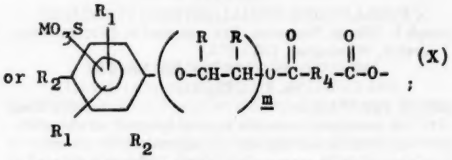
(VII)



(VIII)



(IX)



(X)

in which R, R_1, R_2, M and *m* are defined as above; and

R_3 is an alkyl radical with 1 to 30 carbon atoms, an aryl, alkylaryl or arylalkyl radical;

R_4 is an alkylene radical with 1 to 30 carbon atoms or an arylene radical; and

n is the number 1 or 2.

3,875,128

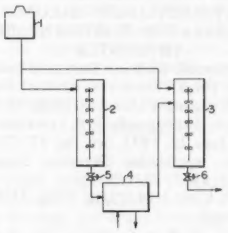
PROCESS AND APPARATUS FOR PRODUCING ETHYLENE POLYMER

Iwao Suzuki, Chiba; Takeo Kamei, Tokyo, and Ryuichi Sonoda, Niihama, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed May 4, 1973, Ser. No. 357,182

Int. Cl. C08f *1/00, 3/04, 19/04*

U.S. Cl. 260—86.7 **4 Claims**



1. In a process for producing a homopolymer or copolymer of ethylene by polymerizing ethylene alone or a mixture of ethylene with one or more other polymerizable monomers in a battery of autoclave reactors, the improvement which comprises connecting two or more autoclave reactors in series by means of piping provided with a heat exchanger; cooling the polymerization reaction mixture withdrawn from the preceding autoclave reactor by passing through said heat exchanger to a temperature above 120°C. but lower than the reaction temperature in the preceding autoclave reactor by 20°C. or more; and introducing the cooled polymerization reaction mixture into the succeeding autoclave reactor to continue the polymerization.

3,875,129

MIXTURES OF THERMOPLASTIC POLYAMIDES

Walter Herwig, Neuenhain, Taunus; Harald Cherdron, Naurod, and Ludwig Brinkmann, Frankfurt, Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Main, Germany

Filed Nov. 14, 1973, Ser. No. 415,636

Claims priority, application Germany, Nov. 16, 1972, 2256217

Int. Cl. C08g *41/04*

U.S. Cl. 260—857 TW **21 Claims**

1. A mixture of thermoplastic polyamides consisting essentially of

a. at least one polyamide composed of units of the general formula

$$(NH\text{-}R_1\text{-}NH\text{-}CO\text{-}R_2\text{-}CO) \qquad Ia$$

in an amount of m mol % and

$$(NH—R_3—CO) \qquad Ib$$

in an amount of *n* mol %, and the end groups R_4 and R_5 wherein R_1 represents cyclohexane-1,3-bis-methylenyl units, from 0 to 50 mol %, based on the total mol percentage of cyclohexane-bis-methylenyl units, of cyclohexane-1,4-bis-methylenyl units and from 0 to 70 mol % of straight chain, bivalent aliphatic hydrocarbon radicals containing from 4 to 20 carbon atoms, the proportion of aliphatic hydrocarbon units being in the range 5 to 70 mol % when $n = 0$ mol %, and when n is greater than 0 mol %, the mol percentage of aliphatic hydrocarbon units being reduced by the proportion which corresponds to n, the mol percentage of aliphatic hydrocarbon units being based on the sum of the cyclohexane-bis-methylenyl units and the aliphatic hydrocarbon units, R_2 represents bivalent aromatic hydrocarbon units containing from 5 to 18 carbon atoms, and from 0 to 70 mol % of bivalent aliphatic saturated hydrocarbon units containing from 3 to 18 carbon atoms, the proportion of aliphatic units being within the range 5 to 70 mol % when $n = 0$ mol %, and when n is greater than 0 mol %, the mol percentage of aliphatic units being reduced by the proportion which corresponds to *n*, the mol percentage of aliphatic hydrocarbon units being based on the sum of the aromatic and aliphatic units,

R_3 represents straight chain, bivalent aliphatic hydrocarbon units containing from 3 to 19 carbon atoms,

R_4 represents H, or OC—R_2—COOH, or OC—R_3—NH,

R_5 represents OH or NH-R_1-NH_2, or NH-R_3-COOH, and *m* and *n* are the mol percentages of the units Ia and Ib in the macromolecule and $m + n = 100$, *n* being 0 or a finite value such that the value of *n* alone or together with the mol percentages of straight chain, bivalent, aliphatic hydrocarbon units R_1 and R_2 is from 5 to 70 mol %, based on the total weight of polyamide, said polyamide (a) having a mean degree of polymerization corresponding to a reduced specific viscosity of from 0.8 to 2.0 dl/g, as determined in a solution of 1 gram of the polyamide in 100 ml of phenol/tetrachloroethane at a weight ratio of 60:40 at 25°C., and

b. at least one polyamide of the general formula II

$$H—NH\text{-}R_3\text{-}CO \text{ —— } OH$$

wherein R_3 has the meaning given above but may be different from the radical R_3 in formula I*b* and *y* indicates the mean degree of polymerization corresponding to a reduced specific viscosity within the range 1.2 to 3.0 dl/g as determined at 25°C. in a solution of 1 graom of the polyamide in 100 ml of phenol/tetrachloroethane at a weight ratio of 60:40, and/or

c. at least one polyamide of the general formula

$$R_8 \text{ —} NH\text{-}R_6\text{-}NH\text{-}CO\text{-}R_7\text{-}CO \text{ —— } R_9$$

wherein

R_6 represents straight chain, aliphatic hydrocarbon units containing from 4 to 20 carbon atoms,

R_7 represents aliphatic saturated hydrocarbon units containing from 3 to 18 carbon atoms,

R_8 represents H or OC—R_7—COOH, and

R_9 represents OH or NH—R_6—NH_2, and

z indicates the mean degree of polymerization corresponding to a reduced specific viscosity within the range 1.2 to 3.0 dl/g as determined at 25°C. in a solution of 1 gram of the polyamide in 100 ml of phenol/tetrachloroethane at a weight ratio of 60:40, the proportion of polyamide (b) and/or (c) in the mixture being from 1 to 70% by weight.

3,875,130

PREPARATION WITH SEEDING OF POLYMERS INSOLUBLE IN THEIR MONOMERIC COMPOSITIONS

Thomas Kemp, Bois-Colombes, France, assignor to Produits Chimiques Pechiney-Saint Gobain, Neuilly-sur-Seine, France

Continuation of Ser. No. 38,863, May 19, 1970, abandoned. This application Mar. 2, 1973, Ser. No. 337,534

Claims priority, application France, May 19, 1969, 69.16028

Int. Cl. C08f *15/30, 15/00*

U.S. Cl. 260—87.1 **28 Claims**

1. A process for the preparation of vinyl polymers having a narrow granulometric distribution which are insoluble in their monomeric compositions, comprising polymerizing a monomeric material selected from the group consisting of vinyl chloride and a mixture consisting essentially of a vinyl chloride with at least one other vinyl monomer copolymerizable therewith in the presence of an organo soluble catalyst and in the presence of 1–20 percent by weight of seed particles having a diameter within the range of 0.01 to 5 microns which are insoluble in the monomeric material, said seed particles being obtained by treating with a semi-solvent a polymer selected from the group consisting of a polyvinyl chloride and a copolymer of vinyl chloride with at least one other vinyl monomer copolymerizable therewith and prepared by polymerization in emulsion or fine suspension.

3,875,131

PROCESS FOR PRODUCING HEAT-STABLE POLYVINYL CHLORIDE

Drahoslav Lim, Stanford, Calif.; Miloslav Kolinsky, and Vaclava Jisova, both of Prague, Czechoslovakia, assignors to Ceskaslovenska Akademi Ved., Prague, Czechoslovakia

Continuation-in-part of Ser. No. 147,597, May 27, 1971, abandoned. This application June 29, 1972, Ser. No. 267,545

Claims priority, application Czechoslovakia, June 11, 1970, 4110-70

Int. Cl. C08f *1/28, 3/30*

U.S. Cl. 260—92.8 R **5 Claims**

1. Process for producing heat stable polyvinyl chloride comprising the steps of polymerizing the corresponding monomer at a temperate in the range of from about 20°C below zero to about 30°C above zero, at a pressure in the range of from about 1 to 4 atmospheres in the presence of tert-butyl-lithium catalyst containing less than 1×10^{-1} % by weight of impurities and recovering heat-stable polyvinyl chloride.

3,875,132

TETRAALKYLCHROMIUM COMPOUNDS AND USE AS OLEFIN POLYMERIZATION CATALYSTS

Walter M. Kruse, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

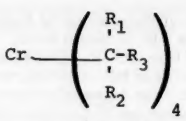
Division of Ser. No. 269,693, July 7, 1972, Pat. No. 3,798,250, which is a continuation-in-part of Ser. No. 112,018, Feb. 2, 1971, abandoned. This application May 21, 1973, Ser. No. 362,028

Claims priority, application Canada, Dec. 30, 1971, 131388

Int. Cl. C08f *1/30*

U.S. Cl. 260—93.7 **13 Claims**

1. A polymerization catalyst comprising a tetraalkylchromium compound having the formula



wherein R_1 and R_2 are each selected from H and methyl and R_3 is selected from H, alkyl, cyclohexyl, alkylcyclohexyl, cyclohexylalkyl and dimethylbenzyl; extended on an oxidic carrier material.

3,875,133

CATALYST COMPOSITION USEFUL FOR THE DIENE POLYMERIZATION AND POLYMERIZATION PROCESS USING THE ABOVE CATALYST SYSTEM

Agostino Balducci; Alessandro Beranger, both of San Danato Milanese, and Margherita Corbellini, Milan, all of Italy, assignors to Snam Progetti S.p.A., San Danato Milanese, Italy

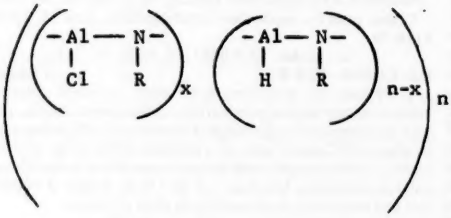
Division of Ser. No. 108,740, Jan. 22, 1972,. This application Aug. 3, 1972, Ser. No. 277,512

Claims priority, application Italy, Jan. 22, 1970, 19652/70

Int. Cl. C08d *1/4, 3/2*

U.S. Cl. 260—94.3 **3 Claims**

1. A process for the stereospecific polymerization of isoprene which comprises polymerizing isoprene in a hydrocarbon reaction medium in the presence of a catalyst system which comprises a compound of titanium tetrachloride and a chlorinated polyiminoalane polymer of the formula



wherein R is a hydrocarbon radical selected from the group consisting of alkyl, aryl and cycloalkyl radicals; x represents the total number of polyiminoalane units having a chlorine atom; n is a number between 2 and 50, the gram atom ratio of aluminum to transition metal is between 1.0 and 5 and the gram atom ratio of chlorine to aluminum being between 0.02 and 0.6.

3,875,134

PROCESS FOR PRODUCING ETHYLENE POLYMER UNDER HIGH PRESSURE

Minoru Morikawa, Chiba; Ryuichi Sonoda, and Kiyoshi Matsuyama, both of Niihama, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed May 7, 1973, Ser. No. 357,659

Int. Cl. C08f *1/60, 3/04*

U.S. Cl. 260—94.9 R **10 Claims**

1. A process for producing an ethylene polymer under a high pressure, which comprises

first feeding compressed ethylene or a compressed mixture of ethylene and comonomers copolymerizable with ethylene into an autoclave reactor,

polymerizing said ethylene or said mixture of ethylene and comonomers under a pressure of 1,000 to 4,000 Kg/cm² at a temperature of 120° to 350°C by addition of 5 to 3,000 parts by weight of a catalyst for 1,000,000 parts by weight of the ethylene or a mixture of ethylene and comonomer,

passing the reaction mixture through a heat exchanger, then introducing the reaction mixture into a tubular reactor, and

further polymerizing ethylene or copolymerizing a mixture of ethylene and comonomers copolymerizable with ethylene under a pressure of 1,000 to 4,000 Kg/cm² at a temperature of 120° to 350°C by further addition of 5 to 3,000 parts by weight of a catalyst for 1,000,000 parts by weight of the ethylene or a mixture of ethylene and comonomer.

3,875,135

COMPOSITIONS OF MATTER AND PROCESSES

Richard Fox, Rosanna, Victoria, and David Gilbert Hay, Balaclava, Victoria, both of Australia, assignors to ICI Australia Limited, Melbourne, Victoria, Australia

Filed June 25, 1973, Ser. No. 373,314

Claims priority, application Australia, July 11, 1972, 9654/72

Int. Cl. C08h *11/00;* **C11d** *5/00*

U.S. Cl. 260—97 **11 Claims**

1. A process for modifying the surface of a metal selected from the group consisting of aluminum, copper, iron, magnesium, nickel, tin and zinc and alloys containing said metal comprising reacting said surface with a material comprising at least one resin acid or a derivative of said acid for a sufficient period of time such that the resultant reaction product forms a water-repellant surface layer on said surface.

3,875,136

PROCESS FOR THE MANUFACTURE OF PEPTIDES CONTAINING CYSTINE

Bruno Kamber, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed June 9, 1972, Ser. No. 261,299

Claims priority, application Switzerland, July 7, 1971, 9959/71; Mar. 6, 1972, 3231/72

Int. Cl. C07c *103/54;* **C08h** *1/00*

U.S. Cl. 260—112.5 **5 Claims**

1. In a process for the manufacture of disulfides by

1. reaction of a thiol with a sulphenyl halide to form a sulphenylthiocarbonate followed by

2. reaction of said sulphenylthiocarbonate with a thiol to form a disulfide, the improvement which comprises reacting, in the first step, a thiol in which the mercapto group is substituted by a trityl or acylamidomethyl group with a suslphenyl halide of the formula I

Hal—S—CO—OR_3

wherein Hal is halogen and R_3 is alkyl, chloroalkyl or lower alkoxyalkyl, in which alkyl has 1–18 carbon atoms, cyclopentyl, cyclohexyl or phenyl-lower alkyl, said thiols used in the first and second step being cysteine or cysteine peptides or derivatives thereof.

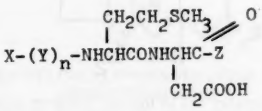
3,875,137

N-SUBSTITUTED ASPACTYL PEPTIDE AMIDS

David A. Jones, Skokie, and Robert H. Mazur, Deerfield, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Apr. 20, 1973, Ser. No. 352,865
Int. Cl. C07c *103/52*; A61k *27/00*
U.S. Cl. 260—112.5 13 Claims

1. A compound of the formula



wherein X is hydrogen or a tertiary-butoxycarbonyl radical, Y is a tryptophanyl radical, *n* is 0 or 1 and Z is an amine residue wherein the amine is an alkyl amine, cycloalkyl amine, heterocyclic amine or aralkyl amine.

3,875,138

PROCESS FOR RECOVERING GLUCAGON

Richard L. Jackson, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Sept. 27, 1973, Ser. No. 401,472
Int. Cl. C07c *103/52*; C07g *7/00*; A61k *17/04*
U.S. Cl. 260—112.5 14 Claims

1. A process for the recovery of glucagon, which comprises the steps of:

A. isolating glucagon-containing protein from insulin process alkaline crystallization supernatant;

B. separating the glucagon from other proteins; and

C. purifying the glucagon obtained from step B.

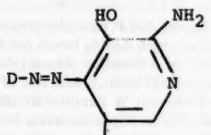
3,875,139

HEAVY METAL COMPLEXES OF AZO DYESTUFFS CONTAINING THE RESIDUE OF A 2-AMINO-3-HYDROXYPYRIDINE

Gerhard Back, Loerrach, Germany, and Arthur Buehler, Rheinfelden, Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed July 24, 1972, Ser. No. 274,148
Claims priority, application Switzerland, July 27, 1971, 11035/71
Int. Cl. C09b *45/14*, *45/16*, *45/24*
U.S. Cl. 260—146 R 5 Claims

1. The iron, cobalt, chromium, copper or nickel complex of a compound of formula



in which:

B is hydrogen, bromine or chlorine

D is pyridyl; benzthiazolyl or benzthiazolyl substituted by methoxy, nitro or chloro; indazolyl or indazolyl substituted by chloro or nitro; triazolyl or triazolyl substituted by carboxyl; benztriazolyl or benztriazolyl substituted by sulfo; pyrazolyl or pyrazolyl substituted by methyl and phenyl; benzimidazolyl or benzimidazolyl substituted by chloro; thiazolyl or thiazolyl substituted by methyl or nitro; pyrazolyl-5-one or pyrazolyl-5-one substituted by methyl or methyl and phenyl; guinolinyl or quinolinyl substituted by sulfo, chloro, bromo, acetylamino, methyl, sulfophenylazo or sulfophenylazo

where the phenyl moiety contains a fibre-reactive group bound via an amino group selected from

chloroacetylamino, bromoacetylamino, β-chloroprropionylamino, β-bromopropionylamino, α,β-dichloropropionylamino, α,β-dibromopropionylamino, acrylamino, β-chloroacrylamino, β-bromoacrylamino, α-chloroacrylamino, α-bromoacrylamino, α,β-dichloroacrylamino, α,β-dibromoacrylamino, trichloroacrylamino, chlorocrotonylamino, propiolylamino, dichlorotriazinylamino, dibromotriazinylamino, or chloro- or bromo-triazinylamino substituted in the 2-position by phenyl, methyl, ethyl, phenylthio, methoxy, ethoxy, isopropoxy, phenoxy, chlorophenoxy, nitrophenoxy, carboxylphenoxy, sulfophenoxy, amino, methylamino, ethylamino, isopropylamino, methoxyethylamino, methoxypropylamino, dimethylamino, benzylamino cyclohexylamino, phenylamino, N-methyl-N-phenylamino methylphenyleneamino, chlorophenyleneamino, hydroxyphenyleneamino, methoxyphenyleneamino or sulfophenyleneamino; acridinyl; carbazolyl; 1,3,4-thiadiazolyl or 1,2,4-thiadiazolyl substituted by pyridyl or phenyl; 1,3,4-thiadiazolyl or 1,3,4-thiadiazolyl substituted by phenyl, methylthio, ethylthio, phenylthio, cyclohexylthio, phenylsulfonyl, methylsulphonyl, methyl, chloro, acetylamino, or carbomethoxyethyl; benzisothiazolyl or benzisothiazolyl substituted by methyl, ethyl, methoxy, chloro, bromo, cyano nitro, methylsulphonyl, N-methylsulfonamide and N,N-dimethylsulfonamide.

3,875,140

PROCESS FOR THE PREPARATION OF FRUCTOSE

Sidney Alan Barker; Peter John Somers, both of Birmingham, and Brian William Hatt, Bromsgrove, all of England, assignors to Boehringer Mannheim GmbH, Mannheim, Germany

Filed May 30, 1973, Ser. No. 365,356
Claims priority, application Germany, June 15, 1972, 2229064
Int. Cl. C13k *9/00*
U.S. Cl. 260—209 R 8 Claims

1. Process for the production of fructose by the isomerization of a sugar selected from the group consisting of glucose, mannose and mixtures thereof comprising isomerizing said sugar in an alkali solution containing an aryl boric acid.

3,875,141

REGENERATED CELLULOSE FILAMENTS

Nicolas B. Drisch, Paris, France, assignor to Chimiotex, S.A., Geneva, Switzerland

Division of Ser. No. 706,030, Feb. 16, 1968, Pat. No. 3,432,589, which is a continuation-in-part of Ser. Nos. 595,563, Nov. 15, 1966, abandoned, and Ser. No. 637,986, May 12, 1967, abandoned. This application Aug. 26, 1968, Ser. No. 778,877
Int. Cl. D06m *13/20*; D01b *3/28*
U.S. Cl. 260—212 5 Claims

1. An alkali resistant regenerated cellulose filament, have an elongation in the wet state lower than 8 percent under a load of 0.5 g/den. after treatment with a 5% caustic soda solution at 20° C. for 15 minutes, said filament having an orientation angle of about 35° to about 47° and an organization degree of about 0.42 to about 0.48 and further having prior to any treatment with an alkaline swelling agent a conditioned tenacity of about 3.5 –7 g/den., a wet tenacity of about 2.7 – 6 g/den. and a work product both in the conditioned and wet state of about 70 – 115.

3,875,142
PROCESS FOR PREPARING 2,3-DIHYDRO-1H-BENZODIAZEPINE DERIVATIVES AND THEIR SALTS

Hisao Yamamoto, Nishinomiya; Shigeho Inaba, Takarazuka; Tadashi Okamoto, Ashiya; Toshiyuki Hirohashi, Kobe; Kikuo Ishizumi, Minoo; Michihiro Yamamoto, Takarazuka; Isamu Maruyama, Minoo; Kazuo Mori, Kobe; Tsuyoshi Kobayashi, Minoo, and Takahiro Izumi, Takarazuka, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

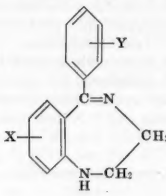
Continuation of Ser. No. 829,760, June 2, 1969, abandoned. This application May 10, 1972, Ser. No. 252,140

Claims priority, application Japan, June 5, 1968, 43-38902; Feb. 28, 1969, 44-15666

Int. Cl. C07d *53/06*

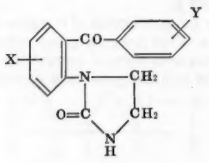
U.S. Cl. 260—239 BD 8 Claims

1. A process for producing 2,3-dihydro-1H-1,4-benzodiazepine derivatives, and their salts, represented by the formula,



(I)

wherein X and Y signify respectively a hydrogen atom or a halogen atom; which process comprises contacting with a basic hydrolyzing agent an imidazolizino-benzophenone derivative represented by the formula,



(II)

wherein X and Y are as defined above, in a liquid medium.

3,875,143
14 BETA,18-(EPOXYETHANOIMINO) STEROIDES

Hansuli Wehrli, Schaffhausen, and Oskar Jeger, Zollikerberg, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

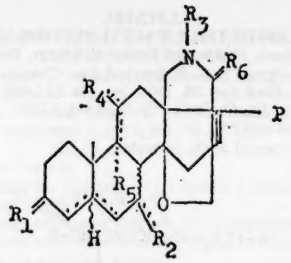
Continuation-in-part of Ser. No. 82,183, Oct. 19, 1970, abandoned. This application May 30, 1973, Ser. No. 365,378

Claims priority, application Switzerland, May 30, 1972, 7967/72; Jan. 25, 1973, 1080/73

Int. Cl. C07c *173/10*

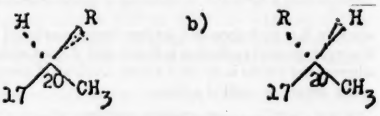
U.S. Cl. 260—239.5 24 Claims

1. Process for the manufacture of compounds of the formula

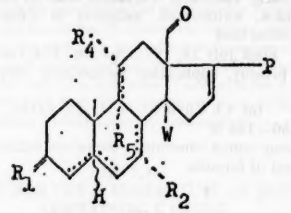


(I)

in which P denotes one of the two following partial formulae

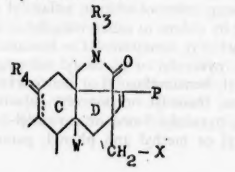


wherein R represents a free, esterified or etherified hydroxyl group, R_1 denotes a free or protected oxo group or a free, esterified or etherified hydroxyl group together with a hydrogen atom, R_2 denotes two hydrogen atoms, or a hydrogen atom next to a 7,8-double bond, a free or protected oxo group or a hydrogen atom together with a free, esterified or etherified hydroxyl group, R_3 denotes hydrogen, a lower alkyl group or a monocyclic lower aliphatic aralkyl group, R_4 denotes two hydrogen atoms or a hydrogen atom next to a 9,11-double bond or a free or protected oxo group or a free, esterified or etherified hydroxyl group together with a hydrogen atom, R_5 denotes a hydrogen atom or a free, esterified or etherified hydroxyl group and R_1 together with R_5 denotes a 3-hydroxy-3,9-oxido group or a 3-hydroxy-3,9-oxido group having the 3-hydroxy group in etherified or esterified form and R_6 denotes two hydrogen atoms or an oxo group, and in which, in one of the positions 4,5 or 5,6 and/or, where relevant, in the case that R_2 or R_4 denotes a H atom, also in one of the position 7,8 and/or 9,11, double bonds may be present, and their salts, characterised in that a compound of the formula



(III)

wherein R_1, R_2, R_4, R_5 and P have the meaning indicated for the formula I and in which double bonds can be present in one of the positions 4,5 or 5,6 and/or, where relevant, in the case that R_2 or R_4 denotes a H atom, also in one of the positions 7,8 and/or 9,11, and wherein W denotes an etherified hydroxyl group, is reacted with an aliphatic amine of the formula R_3-NH_2, wherein R_3 has the meaning indicated above for the formula I, or with ammonia, the resulting Schiff's base is reduced with an alkali borohydride or some other complex light metal hydride of lower basicity than the alkali metal borohydride to give the corresponding amine, the latter is reacted with a halogenoacetic acid halide, the compounds thus obtained, of the partial formula



(IV)

wherein R_3, R_4, P and W have the above meaning and X represents a halogen atom, are treated with a strong acid, whereby the group W is converted into the hydroxyl group, the resulting compounds are cyclised by treatment with a basic agent.

3,875,144

4-AZATRICYCLO(4.3.1.1^{3,8})UNDECANE-4-ALKANOL HYDROCHLORIDES

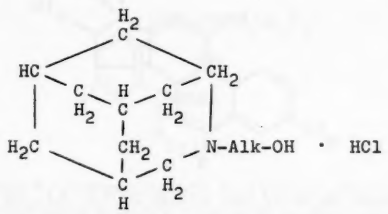
H. William Sause, Deerfield, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 292,983, Sept. 28, 1972, Pat. No. 3,845,038. This application Sept. 28, 1973, Ser. No. 401,813

Int. Cl. C07d *41/04*

U.S. Cl. 260—239 B **6 Claims**

1. A compound of the formula



wherein Alk represents alkylene containing more than 1 and fewer than 7 carbons.

3,875,145

PURIFICATION OF TRIS[1-(2-METHYL) AZIRIDINYL]PHOSPHINE OXIDE

Ronald D. Law, Brigham City, Utah, assignor to Thiokol Corporation, Bristol, Pa.

Filed Jan. 14, 1974, Ser. No. 432,936

Int. Cl. C07f *9/56*

U.S. Cl. 260—239 EP **8 Claims**

1. A process for removing impurities from contaminated tris[1-(2-methyl)aziridinyl]phosphine oxide, which comprises:

dispersing the contaminated tris[1-(2-methyl)aziridinyl]phosphine oxide in an organic solvent selected from the group consisting of benzene, chloroform, and mixtures of chloroform and carbontetrachloride,

extracting a portion of the tris[1-(2-methyl)aziridinyl]phosphine oxide from the organic solvent with water,

extracting a portion of the tris[1-(2-methyl)aziridinyl]phosphine oxide from the water with methylene chloride, and

removing the methylene chloride from tris[1-(2-methyl)aziridinyl]phosphine oxide.

3,875,146

PROCESS TO PREPARE INTERMEDIATES FOR THE PREPARATION OF CEPHALOSPORINS AND PENICILLINS

Burton G. Christensen, Scotch Plains; Raymond A. Firestone, Fanwood, and David B. R. Johnston, Warren, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

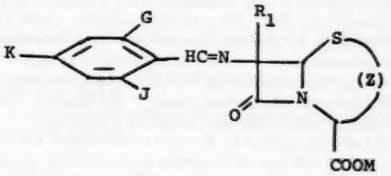
Filed Apr. 11, 1972, Ser. No. 243,057

Claims priority, application United Kingdom, Apr. 30, 1971, 13008/71; Sept. 1, 1971, 40813/71; Sept. 1, 1971, 40814/71; Nov. 29, 1971, 55232/71

Int. Cl. C07d *99/16, 99/24*

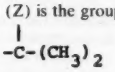
U.S. Cl. 260—239.1 **19 Claims**

1. The process of preparing the compound having the formula:

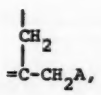


wherein M is benzyl, benzhydryl, trimethylsilyl, trichloroethyl, methoxymethyl, benzoylmethyl, or methoxybenzyl:

(Z) is the group



or

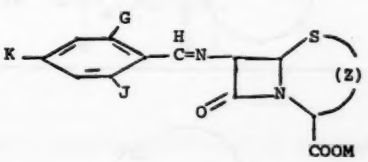


wherein A is hydrogen, loweralkanoyloxy, carbamoyloxy, thiocarbamoyloxy, N-loweralkycarbamoyloxy, N-loweralkylthiocarbamoyloxy, N,N-diloweralkylthiocarbamoyloxy, pyridinium, alkylpyridinium, halopyridinium, or aminopyridinium;

wherein each of G, K, and J are hydrogen, halo, nitro, methylsulfonyl, carboxyester, carboxyamide, or cyano;

and wherein R_1 is loweralkoxy, loweralkylthio, halo;

which comprises reacting a compound of the formula



wherein M is benzyl, benzhydryl, trimethylsilyl, trichloroethyl, methoxymethyl, benzoylmethyl, or methoxybenzyl;

(Z) is the group

or

wherein A is hydrogen, loweralkanoyloxy, carbamoyloxy, thiocarbamoyloxy, N-loweralkylcarbamoyloxy, N-loweralkylthiocarbamoyloxy, N,N-diloweralkylcarbamoyloxy, N,N-diloweralkylthiocarbamoyloxy, pyridinium, alkylpyridinium, halopyridinium, or aminopyridinium:

and wherein each of G, K, and J are hydrogen, halo, nitro, methyl sulfonyl, carboxyester, carboxyamide, or cyano;

first with an activating agent such as triloweralkylamine, loweralkyl bearing 1–4 carbon atoms; pyridine; lithium alkyl having 1–4 carbon atoms; phenyl lithium or sodium hydride; at a temperature of from about −100° to 0° C., then with an approximately equivalent weight of a reagent capable of substituting the desired R_1 group, respectively: loweralkyl peroxide, methyl t-butylperoxide, methylphenyl sulfenate, o-methyldimethyl sulfoxonium methosulfate, or N-methoxypyrridinium methosulfate; loweralkyl disulfide or loweralkane sulfenyl halide; tertbutylhypohalite, perhalomethylhypohalite, N-halosuccinimide, perhalomethylpohalite, or molecular halogen;

and recovering the desired product thereby produced.

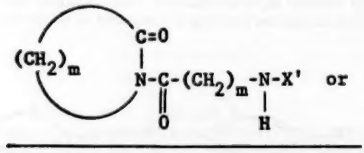
3,875,147

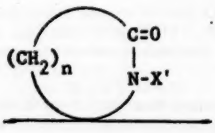
POLYMERIZATION OF 2-PYRROLIDONE

Sam Kwon Choi, Seoul, South Korea, assignor to Chevron Research Company, San Francisco, Calif.

Filed Nov. 24, 1972, Ser. No. 309,082
Int. Cl. C07d *27/08*
U.S. Cl. 260—239.3 R **8 Claims**

1. A complex of Lewis acid of the formula MXa and a halogenated lactam of the formula:





wherein

m is 2 or 3;

n is 5 to 11;

M is a metal of Group IIIA, IVA, VA, VIA or IVB of the Periodic Table;

a is the valence of M; and

X and X′ are independently chlorine or bromine.

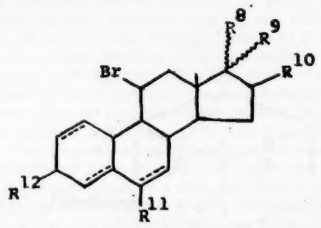
3,875,148

9α-UNSUBSTITUTED-11β-BROMO-19-NORSTEROIDS

Joseph Elks, London; Gordon Hanley Phillipps, Greenford; Alan Tulley, Southport; Leslie Stephenson, and Margaret Elizabeth Hill, both of London, all of England, assignors to Glaxo Laboratories, Greenford, England

Continuation of Ser. No. 161,949, July 9, 1971, abandoned, which is a continuation of Ser. No. 795,064, Jan. 29, 1969, abandoned. This application Feb. 19, 1974, Ser. No. 443,386
Int. Cl. C07c *173/00*
U.S. Cl. 260—239.5 **10 Claims**

1. A 9α-unsubstituted-11β-bromo-19-nor-steriod of the androstane or pregnane series selected from the group consisting of those of the formula



wherein the dotted lines between the 1,2-, 4,5-, and 6,7-positions indicate the presence of single or double bonds;

R^8 is a member selected from the group consisting of a hydrogen atom, an hydroxy group and a protected hydroxy group selected from the group consisting of an aliphatic acyloxy group having 1–9 carbon atoms in the aliphatic portion, a cycloaliphatic acyloxy group having up to 7 carbon atoms, a mono-carbocyclic aryl acyloxy group, a mono-carbocyclic araliphatic acyloxy group having 1–9 carbon atoms in the aliphatic portion, an alkoxy group having 1–5 carbon atoms and a monocyclic aralkoxy or aryloxy group;

R^9 is a hydrogen atom, an acetyl group, an aliphatic acyloxy acetyl group having 1–9 carbon atoms in said aliphatic group, a saturated aliphatic hydrocarbon group having 1–9 carbon atoms, an unsaturated aliphatic hydrocarbon group having 1–9 carbon atoms, or a saturated or unsaturated aliphatic hydrocarbon having 1–9 carbon atoms substituted by a member of the class consisting of a chlorine atom, an hydroxy group and an aliphatic acyloxy group having 1–9 carbon atoms, or R^8 and R^9 together represent a member selected from the group consisting of an oxo group, a ketal and an enol ether group, provided that R^8 and R^9 are not both hydrogen;

R^{10} represents a member selected from the group consisting of a methyl group, a methoxy group, a methylene group and a hydrogen atom; or R^8 and R^{10} together represent a 16,17-methylene group or a carbon-carbon bond;

R^{11} represents a member selected from the group consisting of a methyl group, a chlorine atom, a fluorine atom and a hydrogen atom; and

R^{12} represents a member selected from the group consisting of an oxo group, a ketal group, a hydroxy group and a protected hydroxy group selected from the group consisting of an aliphatic acyloxy group having 1–9 carbon atoms in the aliphatic portion, a cycloaliphatic acyloxy group having up to 7 carbon atoms, a mono-carbocyclic aryl acyloxy group, a mono-carbocyclic araliphatic

acyloxy group having 1–9 carbon atoms in the aliphatic portion, an alkoxy group having 1–5 carbon atoms and a mono-cyclic aralkoxy or aryloxy group; and where R^{12} represents an oxo group, the enol ethers or esters thereof.

3,875,149

OXIMES OF 1-(ORTHO-ACYL-PHENOXY)-2-HYDROXY--AMINOPROPANES

Kenneth Robert Harry Wooldridge, Brentwood, and Berkeley Basil, Highwood near Chelmsford, both of England, assignors to May & Baker Limited, Dagenham, Essex, England

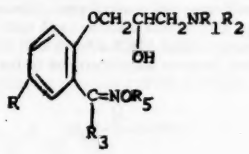
Continuation-in-part of Ser. No. 204,682, Dec. 3, 1971, abandoned, which is a continuation-in-part of Ser. No. 130,793, April 2, 1971, abandoned, which is a continuation-in-part of Ser. No. 729,394, May 15, 1968, abandoned. This application Dec. 19, 1972, Ser. No. 316,508

Claims priority, application United Kingdom, May 16, 1967, 22735/67; Dec. 22, 1967, 58516/67

Int. Cl. C07d *87/38;* **C07c** *131/00*

U.S. Cl. 260—240 G **13 Claims**

1. An oxime of the formula:



wherein R is hydrogen or phenyl, R_1 is hydrogen, alkyl of up to 6 carbon atoms, or hydroxyalkyl of up to 6 carbon atoms, R_2 is alkyl of up to 6 carbon atoms or hydroxyalkyl of up to 6 carbon atoms, or R_1 and R_2 together with the nitrogen to which they are attached represent morpholino, R_3 is hydrogen or alkyl of up to 6 carbon atoms, and R_5 is hydrogen or phenylalkyl of up to 6 carbon atoms in the alkyl residue, and non-toxic acid addition salts thereof.

3,875,150

NEW SULFAMYL-ANTHRANILIC ACIDS

Peter Werner Feit, Gentogte, and Ole Bent Tvaermose Neilsen, Vanlose, both of Denmark, assignors to Lovens Kemiske Fabrik Producktionsaktieselskab, Ballerup, Denmark

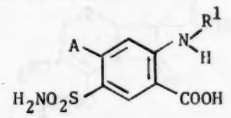
Division of Ser. No. 31,413, April 23, 1970, Pat. No. 3,755,383. This application Feb. 28, 1973, Ser. No. 336,758

Claims priority, application United Kingdom, Apr. 29, 1969, 21890/69

Int. Cl. C07d *5/16*

U.S. Cl. 260—239.6 **4 Claims**

1. A compound of the formula



a pharmaceutically acceptable salt thereof or an ester thereof with cyanomethanol, benzyl alcohol, or a lower alkanol, wherein, A is R^2O- or R^2-S-, R^1 is benzyl, furylmethyl, thienylmethyl or pyridylmethyl, and R^2 is phenyl or pyridyl; provided that at least one of R^1 or R^2 is or contains a heterocyclic radical.

3,875,151

PROCESS FOR THE MANUFACTURE OF AMINO-COMPOUNDS

Bruno Fechtig, Reinach; Ernst Vischer, Basel; Hans Bickel, Binningen, all of Switzerland; Rolf Bosshardt, deceased, late of Basel, Switzerland; by Ruth Elisabeth Bosshardt-Schar, legal representative, Arlesheim, Switzerland, and Jakob Urech, Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

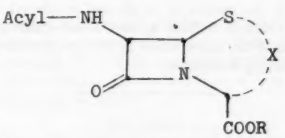
Continuation of Ser. No. 200,511, Nov. 19, 1971, Pat. No. 3,697,515, which is a continuation of Ser. No. 842,359, July 16, 1969, abandoned, which is a continuation-in-part of Ser. No. 493,223, Oct. 5, 1965, abandoned, which is a continuation-in-part of Ser. No. 344,803, Feb. 14, 1964, abandoned. This application Oct. 2, 1972, Ser. No. 293,906

Claims priority, application Switzerland, Feb. 18, 1963, 1992/63; Mar. 1, 1963, 2675/63; Apr. 3, 1963, 4249/63; June 13, 1963, 7358/63; July 2, 1963, 8246/63; Oct. 2, 1963, 12112/63; Nov. 6, 1963, 13600/63; Jan. 22, 1964, 730/64; Oct. 9, 1964, 13166/64; Nov. 13, 1964, 14696/64. The portion of the term of this patent subsequent to Oct. 10, 1989, has been disclaimed.

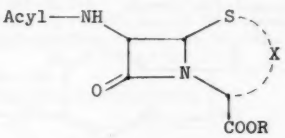
Int. Cl. C07d *93/08*

U.S. Cl. 260—243 R **13 Claims**

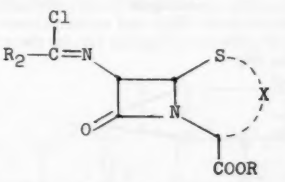
1. In a process for splitting the acylamino group in a compound of the formula



in which "acyl" is the acyl residue of a carboxylic acid, the group of the formula —COOR represents a blocked carboxyl group, and —S . . . . X . . . . is an S-methylene or an S-ethylidene grouping, to form the corresponding amino group, the steps which comprise reacting, in the presence of a base, a compound of the formula

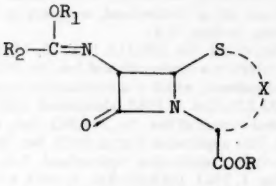


in which "acyl" is the acyl residue of a carboxylic acid, the group of the formula —COOR represents a blocked carboxyl group, and —S . . . . X . . . . is an S-methylene or an S-ethylidene grouping with an agent capable of forming an imide halide to provide a compound of the formula



wherein R_2 is said acyl residue of a carboxylic acid devoid of the

portion and —COOR is defined as above, converting the imide halide into the imino ether by treatment with an alkanol or a phenyl-lower alkanol to provide a compound of the formula



wherein R_2 is said acyl residue of a carboxylic acid devoid of the

portion, R_1 is the residue of an alkanol or phenyl-lower alkanol and —COOR is defined as above and splitting the C=N-double bond of the imino ether by treatment with a hydroxy-group-containing compound.

3,875,152

INTERMEDIATES FOR PRODUCING SEMI-SYNTHETIC CEPHALOSPORINS AND METHODS OF PRODUCTION

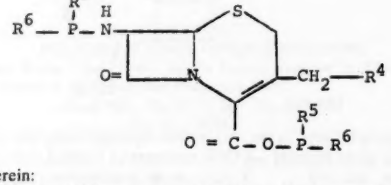
John H. Sellstedt, Pottstown, Pa., assignor to American Home Products Corp., New York, N.Y.

Division of Ser. No. 197,142, Nov. 9, 1971. This application July 11, 1973, Ser. No. 378,308

Int. Cl. C07d *99/24, 99/16*

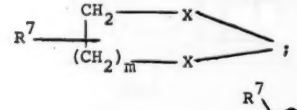
U.S. Cl. 260—243 C **6 Claims**

1. A compound of the formula:

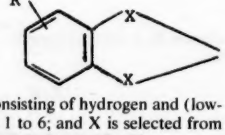


wherein:

R^4 is selected from the class consisting of hydrogen, (lower-)alkanoyloxy containing two to eight carbon atoms, and a quaternary ammonium radical; R^5 and R^6 are selected from the class consisting of (lower)alkyl, phenyl, naphthyl, phenyl(lower alkyl) and naphthyl(lower)alkyl; and R^5 and R^6 when joined together with the phosphorus atom form the ring



or



R^7 is selected from the class consisting of hydrogen and (lower)alkyl; *m* is an interger from 1 to 6; and X is selected from the class consisting of oxygen, methylene and sulfur.

3,875,153

THIOVINYL(THIOACETAMIDO) CEPHALOSPORINS

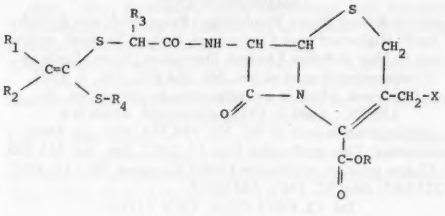
Uwe D. Treuner, and Hermann Breuer, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 31, 1973, Ser. No. 365,816

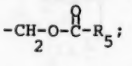
Int. Cl. C07d *99/24*

U.S. Cl. 260—243 C **10 Claims**

1. A compound of the formula



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, tri(-lower alkyl)silyl, alkali metal, alkaline earth metal, dibenzylamine, N,N-dibenzylamine, N,N-dibenzylethylene diamine, lower alkylamine, N-lower alkylpiperidine or the group



R_1 is cyano; R_2 is cyano or phenylsulfonyl; R_3 is hydrogen, lower alkyl, phenyl or thienyl; R_4 is hydrogen or lower alkyl; R_5 is lower alkyl, phenyl or phenyl-lower alkyl; and X is hydrogen, hydroxy or lower alkanoyloxy.

3,875,154

CERTAIN 5-THIA-1-AZABICYCLO[4.2.0]OCTENES

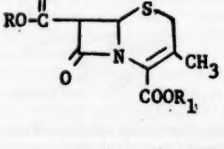
Henry Rapoport, Berkeley, Calif., assignor to The Regents of The University of Ca., Berkeley, Calif.

Division of Ser. No. 289,405, Sept. 15, 1972, Pat. No. 3,799,939, which is a division of Ser. No. 48,550, June 22, 1970, Pat. No. 3,714,156. This application Dec. 17, 1973, Ser. No. 425,439

Int. Cl. C07d *93/08*

U.S. Cl. 260—243 R **2 Claims**

1. A compound of the formula:



where R and R_1 are each hydrogen, lower alkyl of from one to four carbon atoms, benzyl, p-methoxybenzyl or trichloroethyl.

3,875,155

PROCESS FOR MAKING SALTS OF 3-ISOPROPYL-2,1,3-ENZOTHIADIAZIN-(4)-ONE-2,2-DIOXIDE

Herbert Maisack, Ludwigshafen; Albrecht Mueller, Frankenthal, and Helmut Romberg, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen/Rhine, Germany

Filed Mar. 4, 1974, Ser. No. 447,918

Claims priority, application Germany, Mar. 31, 1973, 2316292

Int. Cl. C07D *93/30*

U.S. Cl. 260—243 R 2 Claims

1. A process for making an aqueous solution of substantially pure salts of 3-isopropyl-2,1,3-benzothiadiazin-(4)-one-2,2-dioxide from a solution of the crude compound in an organic solvent, wherein the organic solution is extracted, in a first process stage, with water at a pH of 2 to 2.5 and then, in a second process stage, with an alkaline aqueous solution.

3,875,156

PHENTHIAZINE DERIVATIVES

Jean-Claude Rene Georges Blondel, Essonne; Jean Clement Louis Fouche, Hauts-De-Seine, and Claude Georges Alexandre Gueremy, Val-de-Marne, all of France, assignors to Rhone-Poulenc S.A., Paris, France

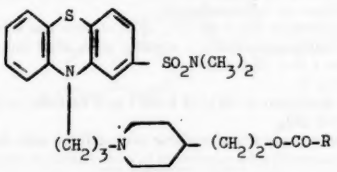
Filed Mar. 28, 1968, Ser. No. 717,012

Claims priority, application France, Mar. 29, 1967, 67.100663

Int. Cl. C07d *93/14*

U.S. Cl. 260—243 A 5 Claims

1. A phenthiazine derivative of the formula:



wherein R represents an alkyl, alkenyl or alkynyl group having 7–17 carbon atoms.

3,875,157

CYCLIC DIAMIDES OF 2-CHLOROETHYL PHOSPHONIC ACID

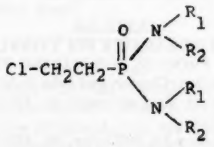
David I. Randall, and Robert W. Wynn, both of Easton, Pa., assignors to GAF Corporation, New York, N.Y.

Division of Ser. No. 887,746, Dec. 23, 1969, Pat. No. 3,711,272. This application Sept. 29, 1971, Ser. No. 184,899

Int. Cl. C07d *87/38*

U.S. Cl. 260—246 B 8 Claims

1. A substituted 2-chloroethyl phosphonacid diamide of the following formula:



wherein R_1 is cycloalkyl of 3 to 8 carbon atoms, R_2 is hydrogen or cycloalkyl of 3 to 8 carbon atoms or R_1 and R_2 together form a heterocyclic ring selected from the group consisting of morpholine, piperidine, pyrrolidine, piperazine and alkyl substituted derivatives thereof wherein the alkyl group has 1–5 carbon atoms.

3,875,158

OXY SUBSTITUTED 2,3 OXY METHYL QUINOXALINES

Hans-Peter Schlunke, Marly, and Christian Egli, Magden, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

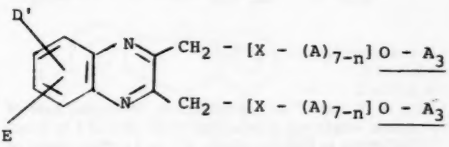
Continuation-in-part of Ser. No. 176,749, Aug. 31, 1971, Pat. No. 3,796,576. This application Mar. 26, 1973, Ser. No. 344,815

Claims priority, application Switzerland, Sept. 4, 1970, 13253/70

Int. Cl. C07d *51/78*

U.S. Cl. 260—250 Q 7 Claims

1. A quinoxaline of the formula



wherein D′ represents chlorine, methoxy, amino, nitro, lower alkyl, carboethoxy or carboxy, E represents hydrogen or lower alkoxy, or wherein D′ and E in vicinal positions, together represent $-O-(CH_2)_m-O-$, wherein m is 1 or 2, and A_3 represents hydrogen or acetyl.

3,875,159

1,3-DIACYL DERIVATIVES OF IMIDAZOLIDINE AND HEXAHYDROPYRIMIDINE

Robert R. Mod, 4600 San Marco Rd.; Frank C. Magne, 2223 Franklin Ave.; Gene Sumrell, 134 Wren St., all of New Orleans; Arthur F. Novak, 656 College Hill Dr., Baton Rouge, all of La., and James M. Solar, 3333 Toledo Ave., Apt. 6, Lubbock, Tex.

Division of Ser. No. 154,698, June 18, 1971, abandoned. This application Mar. 4, 1974, Ser. No. 448,428

Int. Cl. C07d *57/28*, *57/30*

U.S. Cl. 260—251 R 11 Claims

1. 1,3-Diacetylhexahydropyrimidine.

3,875,160

QUATERNARY-TRICYCLIC QUINAZOLINONES

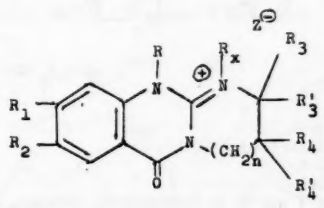
Goetz E. Hardtmann, 208 Brooklake Rd., Florham Park, N.J. 07932

Filed Jan. 22, 1973, Ser. No. 325,946

Int. Cl. C07d *51/42*

U.S. Cl. 260—256.4 F 34 Claims

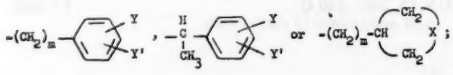
1. A compound of the formula:



wherein

R_x is alkyl of 1 to 3 carbon atoms,

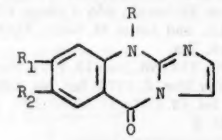
Z^- is a pharmaceutically acceptable inorganic anion,
each of R_1 and R_2 is, independently, hydrogen, halo of atomic weight no greater than 36 or alkyl of 1 to 3 carbon atoms, or both are alkoxy of 1 to 2 carbon atoms; or one is hydrogen and the other bromo, trifluoromethyl or alkoxy of 1 to 2 carbon atoms;
n is 0 to 2,
each of R_3 and R'_3 is hydrogen or alkyl of 1 to 2 carbon atoms,
each of R_4 and R'_4 is hydrogen or alkyl of 1 to 3 carbon atoms, provided that no more than three of R_3, R'_3, R_4 and R'_4 is alkyl,
R is alkyl of 1 to 6 carbon atoms, alkenyl of 3 to 8 carbon atoms



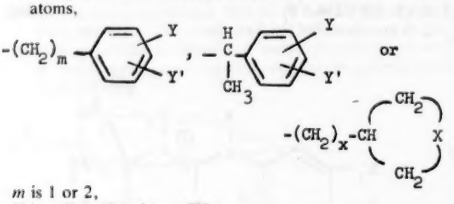
X is a direct bond or $-(CH_2)_y-$
y is 1 to 3,
m is 0 to 2,
each of Y and Y' is, independently, hydrogen, halo of atomic weight not greater than 36 or alkyl of 1 to 3 carbon atoms, or both are alkoxy of 1 to 2 carbon atoms; or one is hydrogen and the other bromo, trifluoromethyl or alkoxy of 1 or 2 carbon atoms.

3,875,161
IMIDAZO(2,1-B)QUINAZOLIN-5(1OH)-ONES
Goetz E. Hardtmann, 208 Brooklake Rd., Florham Park, N.J. 07932, assignor to Sandoz-Wander, Inc., Hanover, N.J.
Continuation-in-part of Ser. No. 163,106, July 15, 1971, abandoned. This application Feb. 12, 1973, Ser. No. 331,561
Int. Cl. C07d *51/42*
U.S. Cl. 260—256.4 F **12 Claims**

1. A compound of the formula:



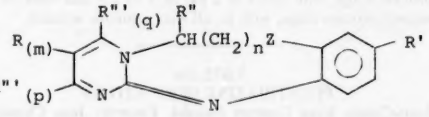
wherein
each of R_1 and R_2 is, independently, hydrogen, halo of atomic weight not greater than 36 or lower alkyl of 1 to 3 carbon atoms, or both are alkoxy of 1 to 2 carbon atoms, or one is hydrogen and the other bromo or lower alkoxy of 1 or 2 carbon atoms,
R is alkyl of 1 to 5 carbon atoms, alkenyl of 3 to 10 carbon atoms,



m is 1 or 2,
X is a direct bond or $-(CH_2)_n-$,
n is 1 to 3,
x is 0 to 2,
each of Y and Y' is, independently, hydrogen, halo of atomic weight not greater than 36, alkyl of 1 to 3 carbon atoms, or both are alkoxy of 1 to 2 carbon atoms, or one is hydrogen and the other bromo or lower alkoxy of 1 or 2 carbon atoms, or a pharmaceutically acceptable acid addition salt thereof.

3,875,162
CERTAIN
6H-PYRIMIDO[1,2-C][1,3,5]BENZOTHIADIAZA COMPOUNDS
Harry Louis Yale, New Brunswick, N.J., and Ramesh B. Petigara, Lansdale, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.
Filed July 26, 1973, Ser. No. 382,802
Int. Cl. C07d *57/12*
U.S. Cl. 260—256.5 R **5 Claims**

1. A compound of the formula



wherein m is 1 or 2; one of p and q is zero or one and the other is zero;
R is F, Cl, Br, alkyl of from 1 to 4 carbons, benzyl, phenyl, or mono-substituted phenyl wherein the substituent is F, Cl, Br, I, alkyl of from 1 to 4 carbons, alkoxy of from 1 to 4 carbons, or trifluoromethyl;
R''' is alkyl of from 1 to 4 carbons, benzyl, phenyl, or mono-substituted phenyl wherein the substituent is F, Cl, Br, I, alkyl of from 1 to 4 carbons, alkoxy of from 1 to 4 carbons, or trifluoromethyl;
R' is hydrogen, F, Cl, Br, CF_3, alkyl of from 1 to 4 carbons, or dialkylamidosulfonyl wherein each alkyl radical has from 1 to 4 carbons;
n is 0 or 1;
R'' is hydrogen or alkyl of from 1 to 4 carbons; and
Z is S or SO_2;
and pharmaceutically acceptable acid-addition salts thereof.

3,875,163
NITROGEN CONTAINING ACYCLIC ISOPRENOID COMPOUNDS
Silvia Tricerri Zumin, Carimate; Mario Riva, Monza, and Giuseppe Iafolla, Milan, all of Italy, assignors to Pierrel S.p.A., Milan, Italy
Continuation-in-part of Ser. No. 271,067, July 12, 1972, abandoned. This application Mar. 27, 1973, Ser. No. 345,256
Claims priority, application United Kingdom, Feb. 29, 1972, 9348/72; Feb. 21, 1973, 9348/72
Int. Cl. C07d *51/70*
U.S. Cl. 260—268 BC **8 Claims**

1. A compound selected from the group consisting of N^1-piperonyl-N^4-3,7,11-trimethyl-2,6,10-dodecatrienylpiperazine and therapeutically acceptable non-toxic acid addition salts thereof.

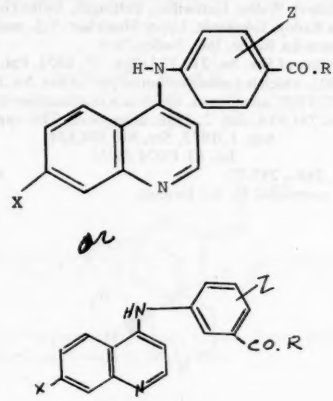
3,875,164
HIGH MOISTURE BARRIER POLYVINYL CHLORIDE FILM AND PROCESS FOR MAKING THE SAME
Robert L. Bennington, Chester, and John T. Massengale, West Chester, both of Pa., assignors to FMC Corporation, Philadelphia, Pa.
Filed May 14, 1973, Ser. No. 359,774
Int. Cl. C08f *45/52*
U.S. Cl. 260—28.5 D **10 Claims**

1. A melt-extruded, self-supporting, plasticized, uncoated polyvinyl chloride film having a high resistance to moisture transmission, said film containing from about 0.5 to 4.0 parts per hundred, based upon the weight of the polyvinyl chloride

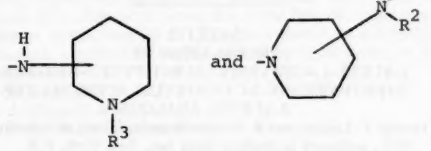
present, of a moistureproofing paraffin wax having a melt temperature within the range of 125°F. to 200 20 .

3,875,165
(4-QUINOLYLAMINO)-(N-PIPERIDYL)BENZAMIDES AND N-[4-QUINOLYAMINO)BENZOYL]PIPERIDINES
John Leheup Archibald, Windsor; John Terence Arnott Boyle, and John Christopher Saunders, both of Maidenhead, all of England, assignors to John Wyeth & Brother Limited, Maidenhead, England
Filed Feb. 22, 1973, Ser. No. 334,799
Int. Cl. C07d *33/54*
U.S. Cl. 260—287 R **12 Claims**

1. A compound selected from the group consisting of bases having the formula



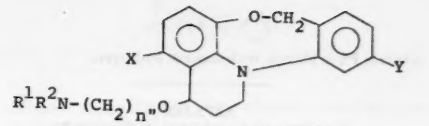
and the acid addition salts of such bases with pharmaceutically acceptable acids, wherein X is a member of the group consisting of halogen and trifluoromethyl, Z is a member of the group consisting of hydrogen, chlorine, methoxy and methyl, and R is a member of the group consisting of



in which each of R^1, R^2 and R^3 is an alkyl group having from one to four carbon atoms.

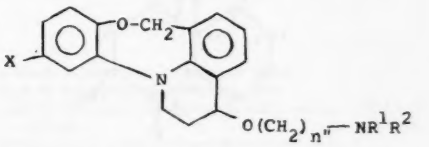
3,875,166
3-(AMINOALKOXY)-2,3-DIHYDROQUINOBENZOXA(OR THIA) ZEPINE DERIVATIVES
Harry L. Yale, New Brunswick, N.J., and Ramesh B. Petigara, Lansdale, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.
Division of Ser. No. 222,286, Jan. 31, 1972, Pat. No. 3,809,698. This application Oct. 29, 1973, Ser. No. 410,860
Int. Cl. C07d *33/52*
U.S. Cl. 260—288 R **4 Claims**

1. A compound having the structure



wherein X and Y are the same or different and are selected from the group consisting of hydrogen and chlorine, at least one of X and Y being hydrogen; R^1 and R^2 are the same or different and are selected from the group consisting of hydrogen and lower alkyl having up to eight carbon atoms; n'' is 2 or 3; and a pharmaceutically acceptable acid-addition salt thereof.

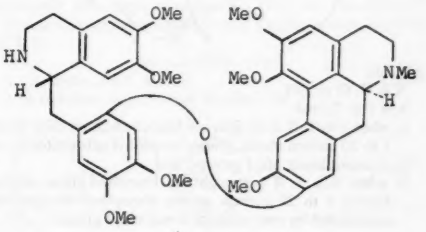
2. A compound having the structure



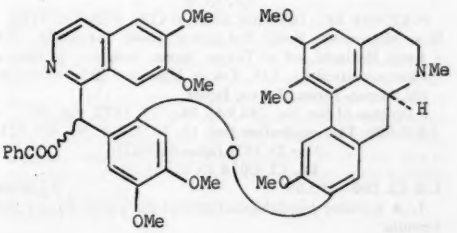
wherein X is selected from the group consisting of trifluoromethyl and chloro; R^1 and R^2 are the same or different and are selected from the group consisting of hydrogen and lower alkyl having up to eight carbon atoms; n'' is 2 or 3; and a pharmaceutically acceptable acid-addition salt thereof.

3,875,167
SYNTHESIS OF THALICARPINE
S. Morris Kupchan, and Andris J. Liepa, both of Charlottesville, Va., assignors to Research Corporation, New York, N.Y.
Filed May 26, 1972, Ser. No. 257,215
Int. Cl. C07d *43/28*
U.S. Cl. 260—289 A **4 Claims**

1. A process wherein the compound of formula



is formed by reacting a compound of the formula



wherein Ph is phenyl, with nascent hydrogen.

3,875,168
7-AMINO-DECAHYDRO-QUINOLINES

Wolfgang Pfleiderer, Konstanz, Germany, and Helmut Zondler, Allschwil, Switzerland, assignors to Ciba-Geigy Corp., Ardsley, N.Y.

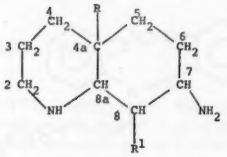
Filed Mar. 26, 1973, Ser. No. 345,154

Claims priority, application Switzerland, Apr. 4, 1972, 4895/72

Int. Cl. C07d *33/52*

U.S. Cl. 260—288 R **4 Claims**

1. A 7-amino-decahydro-quinoline of the formula



(I)

wherein R is hydrogen, alkyl of 1 to 5 carbon atoms, or γ-aminopropyl; and R_1 is methyl or hydrogen.

3,875,169
BICYCLIC HINDERED AMINES

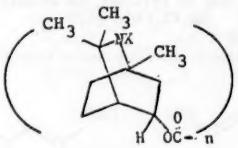
Chester E. Ramey, Spring Valley, and John J. Luzzi, Carmel, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 28, 1973, Ser. No. 429,436

Int. Cl. C07d *39/00*

U.S. Cl. 260—293.54 **8 Claims**

1. A compound of the formula



I

wherein

X is H, O or OH,

n is 1 or 2, and

a. when *n* is 1, R is straight- or branched-chain alkyl having 1 to 20 carbon atoms, phenyl or phenyl substituted by one or more lower alkyl groups, and

b. when *n* is 2, R is straight- or branched-chain alkylene having 1 to 20 carbon atoms, phenylene or phenylene substituted by one or more lower alkyl groups.

3,875,170
PYRIDINE BIS (DITHIOCARBAMATE) DERIVATIVES

Ikyo Matsumoto; Kanji Nakagawa; Meiki Matsuzaki, and Kenji Horiuchi, all of Tokyo, Japan, assignors to Banyu Pharmaceutical Co., Ltd., Tokyo, Japan and Hidaka Hiroyoshi, Mezon-Torisu, Tokyo, Japan

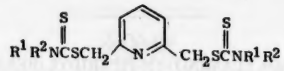
Division of Ser. No. 254,943, May 19, 1972, Pat. No. 3,810,900. This application Dec. 18, 1973, Ser. No. 425,721

May 25, 1971 Japan 46-35133

Int. Cl. C07d *29/10, 31/50*

U.S. Cl. 260—293.69 **5 Claims**

1. A pyridine bis(dithiocarbamate) derivative having the formula:



wherein R^1 represents lower alkyl, lower alkene group or phenyl and R^2 represents a hydrogen atom or a lower alkyl group or R^1 and R^2 taken togehter may form a piperidine ring with the nitrogen atom.

3,875,171
TRANS-4-PIPERIDINE ACETIC ACIDS AND ESTERS AND RACEMIC CIS-4-PIPERIDINE ACETIC ACIDS AND ESTERS

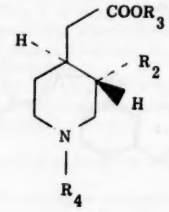
Juerg Albert Walter Gutzwiller, Bettingen, Switzerland, and Milan Radoje Uskokovic, Upper Montclair, N.J., assignors to Hoffman-La Roche, Inc., Nutley, N.Y.

Division of Ser. No. 212,774, Dec. 27, 1971, Pat. No. 3,772,302, which is a continuation-in-part of Ser. No. 104,784, June 27, 1969, abandoned, which is a continuation-in-part of Ser. No. 741,914, July 2, 1968, abandoned. This application Aug. 1, 1973, Ser. No. 384,524

Int. Cl. C07d *29/24*

U.S. Cl. 260—293.77 **9 Claims**

1. A compound for the formula



wherein R_2 is selected from the group consisting of vinyl and lower alkyl; R_3 is hydrogen and lower alkyl, and R_4 is selected from the group consisting of hydrogen, lower alkanoyl of 1–7 carbon atoms, benzoyl, halosubstituted benzoyl, lower alkoxy-substituted benzoyl and lower alkyl-substituted benzoyl, its antipode or racemate.

3,875,172
PREPARATION OF 1-ALKYL-1,4-DIHYDRO-7-SUBSTITUTED-4-OXO-1,8-NAPHTHYRIDINE-3-CARBOXYLIC ACIDS VIA THE 3-ACETYL ANALOGS

George Y. Lesher, and R. Pauline Brundage, both of Schodack, N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Filed Feb. 20, 1973, Ser. No. 333,541

Int. Cl. C07d *31/36*

U.S. Cl. 260—295.5 B **18 Claims**

1. The process which comprises reacting 2-amino-6-Q′-pyridine with lower-alkyl (lower-alkoxy)methyleneacetoacetate to produce lower-alkyl α-(6-Q′-2-pyridylaminomethylene)acetoacetate, heating lower-alkyl α-(6-Q-2-pyridylaminomethylene)acetoacetate in an inert solvent at about 200°–335°C. to produce 3-acetyl-1,4-dihydro-7-Q-4-oxo-1,8-naphthyridine, reacting said 4-oxo-1,8-naphthyridine with a lower-alkylating agent to produce 3-acetyl-1-(lower-alkyl)-1,4-dihydro-7-Q-4-oxo-1,8-naphthyridine and converting the latter to 1-(lower-alkyl)-1,4-dihydro-7-Q-4-oxo-1,8-naphthyridine-3-carboxylic acid by reaction with an agent capable of converting $—COCH_3$ to —COOH, where Q is lower-alkyl, hydroxymethyl, lower-alkanoyloxymethyl, 4(or 3)-pyridyl or 4(or 3)-pyridyl having

one or two lower-alkyl substituents, and Q′ is like Q but excluding lower-alkanoyloxymethyl.

3,875,173

METHOD FOR INTRODUCING HALOGEN INTO BENZIMIDAZOLE AND IMIDAZOPYRIDINE COMPOUNDS

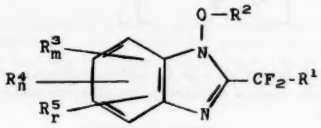
George O. P. O'Doherty, Greenfield, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

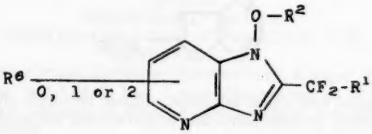
Continuation-in-part of Ser. No. 102,266, Dec. 28, 1970, abandoned. This application Dec. 13, 1972, Ser. No. 314,882

Int. Cl. C07d *49/38, 31/42*

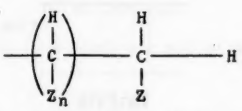
U.S. Cl. 260—294.8 C **4 Claims**

1. A process suitable for introducing chlorine or fluorine into a benzimidazole or imidazopyridine compound, which comprises reacting a first compound of one of the formulae



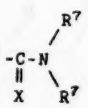


wherein R^1 represents hydrogen, chloro, fluoro, perfluoroalkyl of C_1–C_6, or radical of the formula



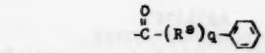
where each Z represents hydrogen or halo and *n* represents 0 or 1; R^2 represents the derivative group formed by reaction of the corresponding 1-hydroxy compound with a chloride, fluoride, oxychloride, oxyfluoride, thiochloride, thiofluoride, or oxide of an element of Group VA of the Periodic Table of an atomic weight from 30 to 122, both inclusive, or a chloride, fluoride, oxychloride, oxyfluoride, or oxide of sulfur; or R^2 represents

1. alkanoyl of C_2–C_{16};
2. alkenoyl of C_3–C_{16};
3. carbamoyl of the formula



wherein x represents oxygen or sulfur; and one R^7 represents phenyl, loweralkyl of C_1–C_4 or loweralkenyl of C_2–C_4, and the other R^7 represents hydrogen, loweralkyl of C_1–C_4, or lower alkenyl of C_2–C_4, subject to the limitation that both R^7 moieties taken together do not contain more than six carbon atoms; or both R^7 moieties taken together represent straight-chain alkylene of C_2–C_6, both inclusive;

4. radical of the formula



wherein R^8 represents methylene, ethylene, or vinylene, and *q* represents 0 or 1;

5. $-SO_2-R^9$ wherein R^9 is loweralkyl as above defined, cycloalkyl of C_5–C_6, phenyl, substituted phenyl as above defined, or benzyl; or
6. radical of the formulae

of C_1–C_4 or

wherein X, as above, is oxygen or sulfur;
each R^3 independently represents halo;
each R^4 independently represents nitro, $-CF_3$, $-CF_2Cl$, or $-CF_2H$;
R^5 represents cyano or loweralkylsulfonyl of C_2–C_4;
m represents an integer of from 0 to 3, both inclusive;
n represents an integer of from 0 to 2, both inclusive;
r represents 0 or 1;
and the sum of *m*, *n*, and *r* is an integer of from 0 to 3, both inclusive; and
each R^6 represents halogen, nitro, $-CF_3$, $-CF_2Cl$, $-CF_2H$, or loweralkylsulfonyl of C_1–C_4, subject to the limitation that not more than one R^6 represents nitro, $-CF_3$, $-CF_2Cl$, $-CF_2H$, or loweralkylsulfonyl as defined;
with a nucleophilic reagent which is a compound which supplies chloride or fluoride.

3,875,174

PYRIDINE DERIVATIVES

Philip Neil Edwards, Macclesfield, England, assignor to Imperial Chemical Industries, Limited, London, England

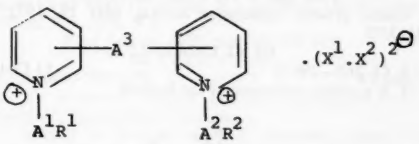
Division of Ser. No. 234,648, March 14, 1972, Pat. No. 3,786,058. This application Dec. 27, 1973, Ser. No. 428,677

Claims priority, application United Kingdom, Mar. 29, 1971, 8071/71

Int. Cl. C07d *31/48*

U.S. Cl. 260—294.8 R **5 Claims**

1. A pyridine derivative of the formula:



wherein R^1 and R^2 which may be the same or different are each alkyl having 8 to 14 carbon atoms, n-undec-10-yl, 2-n-hexyloxyethyl, 2-(2-butoxyethoxy-ethyl), 3,4-dichlorophenyl, 4-chlorobenzyl, 2,4-dichlorobenzyl or 2-naphthylmethyl; A^1 and A^2 are each a direct linkage or a linking group of the formula $-CH_2CO.NH-$ wherein the methylene is joined to the pyridine nitrogen; $(X^1.X^2)^{2-}$ represents two monoanions or a dianion selected from the group consisting of two halide, methanesulphonate, toluene-p-sulphonate or acetate ions or the sulphate dianion; and A^3 is a linking group of the formula: $-NH(CH_2)_mNH-$
wherein *m* is 0 to 12.

3,875,175

PYRIDINE DERIVATIVES

Philip Neil Edwards, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

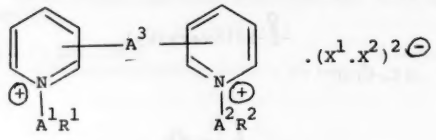
Division of Ser. No. 234,648, March 14, 1972, Pat. No. 3,786,058. This application Dec. 27, 1973, Ser. No. 428,678

Claims priority, application United Kingdom, Mar. 29, 1971, 8071/71

Int. Cl. C07d *31/44*

U.S. Cl. 260—295 E 5 Claims

1. A pyridine derivative of the formula:



wherein R^1 and R^2 which may be the same or different, are each alkyl having 8 to 14 carbon atoms, n-undec-10-enyl, 2-n-hexyloxyethyl, 2-(2-butoxyethoxyethyl), 3,4-dichlorophenyl, 4-chlorobenzyl, 2,4-dichlorobenzyl or 2-naphthylmethyl; A^1 and A^2 are each a linking group of the formula $—CH_2CONH—$ wherein the methylene is joined to the pyridine nitrogen; $(X^1.X^2)^{2-}$ represents two monoanions or a dianion selected from the group consisting of two halide, methanesulphonate, toluene-p-sulphonate or acetate ions or the sulphate dianion; and A^3 is a linking group of the formula: $—(CH_2)_nNH.CO(CH_2)_m(CO_x.NH(CH_2)_n—$ wherein n is 0 or 1; m is 0 to 12; and x is 0 or 1.

3,875,176

2-BENZOYL -3-AMINO-PYRIDINES

Walter Von Bebenburg, Buschschlag, and Heribert Offermanns, Grossauheim, both of Germany, assignors to Deutsche Gold-und-Silber-Scheideanstalt vormals Roessler, Frankfurt (Main), Germany

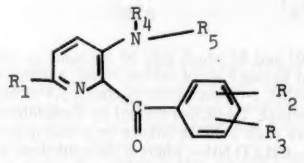
Filed Apr. 3, 1973, Ser. No. 347,361

Claims priority, application Austria, May 10, 1972, A 4113/72

Int. Cl. C07d *31/42*

U.S. Cl. 260—296 R 11 Claims

1. A pyridine compound of the formula



where R_1 is halogen, R_2 is hydrogen, halogen, trifluoromethyl, hydroxy, cyano, lower alkyl or lower alkoxy, R_3 is hydrogen, halogen, hydroxy or lower alkyl, R_4 is hydrogen or lower alkyl and R_5 is hydrogen or lower alkyl or a pharmacologically acceptable salt thereof.

3,875,177

PROCESS FOR THE MANUFACTURE OF BIS(BENZOTHIAZYLSULPHENE)AMIDES

Jean-Marc Maison, Paris, France, assignor to Rhone-Poulenc S.A., Paris, France

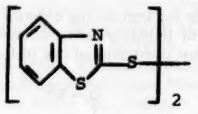
Continuation of Ser. No. 110,745, Jan. 28, 1971, abandoned. This application Apr. 27, 1973, Ser. No. 355,005

Claims priority, application France, Jan. 30, 1970, 70.03351

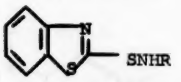
Int. Cl. C07d *91/48*

U.S. Cl. 260—306.6 A 6 Claims

1. Process for preparing a bis-(benzothiazylsulphene)amide of general formula:



in which R is alkyl of 1 to 12 carbon atoms, cyclopentyl or cyclohexyl, wherein a benzothiazylsulpheneamide of general formula:



is reacted with maleic anhydride, succinic anhydride, glutaric anhydride, phthalic anhydride, or pyromellitic anhydride.

3,875,178

UPSILON-TRIAZOLE COMPOUNDS POSSESSING A MODIFIED METHYL GROUP IN THE 4-POSITION

Rudolf Kirchmayr, Binningen, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

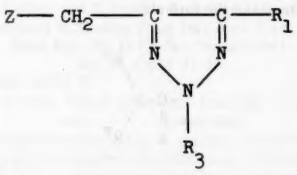
Filed Mar. 17, 1971, Ser. No. 125,383

Claims priority, application Switzerland, Mar. 23, 1970, 4320/70

Int. Cl. C07d *55/02*

U.S. Cl. 260—308 A 6 Claims

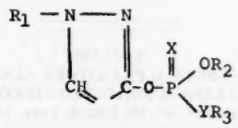
1. A v-triazole of the formula



wherein Z is hydroxyl, benzoxy, benzoxy substituted by alkyl with 1 to 4 carbon atoms or by alkoxy with 1 to 4 carbon atoms or by halogen, alkanoyloxy with 1 to 4 carbon atoms, alkoxy with 1 4 carbon atoms, or alkylmercapto with 1 to 4 carbon atoms, R_1 is alkyl with 1 to 4 carbon atoms, phenyl, phenyl substituted by alkyl with 1 to 4 carbon atoms or by alkoxy with 1 to 4 carbon atoms or by halogen, and R_3 is a 3-phenylcoumarinyl-(7) group.

3,875,179
1,2,4-TRIAZOL-3-OL ESTERS
Dag Dawes, Pratteln, and Beat Bohner, Binningen, both of Switzerland, assignors to Ciba-Geigy Corp., Ardsley, N.Y.
Filed Nov. 1, 1972, Ser. No. 302,691
Claims priority, application Switzerland, Oct. 21, 1971, 15340/71; Aug. 24, 1972, 12541/72
Int. Cl. C07d *55/06*
U.S. Cl. 260—308 R 8 Claims

1. A compound of the formula



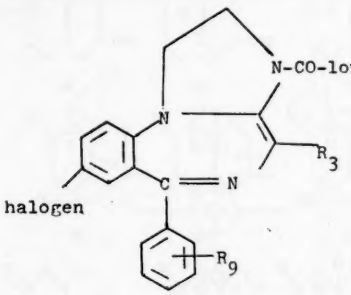
wherein R_1 represents a phenyl group substituted by one to five fluorine atoms or halo-lower alkyl groups or by one chlorine atom and one substituent group selected from fluorine atoms or halo-lower alkyl groups, R_2 and R_3 are each lower alkyl and X and Y are each oxygen or sulphur.

3,875,180
HERBICIDALLY ACTIVE IMIDAZOLIDIN-2-ONE-1-CARBOXYLIC ACID ISOBUTYL AMIDE
Ferdinand Munz, Schildgen; Helmuth Hack, Cologne, Buchheim, and Ludwig Eue, Cologne-Stammheim, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Division of Ser. No. 845,540, July 28, 1969,. This application June 26, 1972, Ser. No. 266,202
Claims priority, application Germany, Aug. 13, 1968, 1795117
Int. Cl. C07d *49/30*
U.S. Cl. 260—309.7 1 Claim

1. Imidazolidin-2-one-1-carboxylic acid isobutyl amide.

3,875,181
3-ACETYL-(1,2 -A)IMIDAZO-1,4-BENZODIAZEPINES
Michael Edward Derieg, Caldwell; Rodney Ian Fryer, North Caldwell, and Leo Henryk Sternbach, Upper Montclair, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.
Division of Ser. No. 210,253, Dec. 20, 1971, Pat. No. 3,796,713. This application Nov. 28, 1973, Ser. No. 419,564
Int. Cl. C07d *49/34*
U.S. Cl. 260—309.7 2 Claims

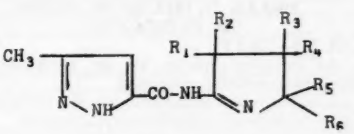
1. A compound of the formula



wherein R_3 signifies hydrogen or a lower alkyl group having from 1 to 4 carbon atoms and R_9 signifies hydrogen or halogen.

3,875,182
PYRAZOLE-5-CARBOXAMIDES
Hermann Bretschneider; Wilhelm Klotzer, both of Innsbruck, Austria; Gunther Bader, Grafelfing-Lochham, Germany, and August Lutz, Birsfelden, Switzerland, assignors to F. Hoffman-La Roche & Co. Aktiengesellschaft, Basel, Switzerland
Filed Feb. 23, 1973, Ser. No. 335,396
Claims priority, application Switzerland, Feb. 28, 1972, 2769/72
Int. Cl. C07d *49/18*
U.S. Cl. 260—310 R 7 Claims

1. A compound of the formula



wherein R_1 and R_2 each represent phenyl, lower alkylphenyl or lower alkoxyphenyl and R_3, R_4, R_5 and R_6 each represent hydrogen or lower alkyl.

3,875,183
PROCESS FOR THE PRODUCTION OF IMIDO-ISOCYANATES
Anthony J. Papa, St. Albans, W. Va., and William R. Proops, Claymont, Del., assignors to Union Carbide Corp., New York, N.Y.
Filed Aug. 23, 1971, Ser. No. 174,238
Int. Cl. C07d *27/00*, *27/52*
U.S. Cl. 260—326 N 13 Claims

1. A process for producing an aromatic isocyanate containing an imido group which process comprises: (I) forming a reaction mixture containing (a) an anhydride of organic polycarboxylic acid, (b) an aromatic polyisocyanate, (c) a catalytic amount of $MB(R)_4$, $(R)_3P$, $(R)_4POOCR$, or $MP(F)_6$ wherein M is an alkali metal and R is an alkyl group or an aryl group, and (d) a catalytic amount of a dialkylsulfoxide; and (II) maintaining the mixture at a temperature at which (a) and (b) react in the presence of (c) and (d) to produce an aromatic isocyanate containing an imido group.

3,875,184
PROCESS FOR THE PURIFICATION OF 2-HYDROXYETHYLPYRROLIDONE
Eugene Victor Hort, Piscataway, N.J., assignor to GAF Corporation, New York, N.Y.
Filed July 27, 1972, Ser. No. 275,545
Int. Cl. C07d *27/08*
U.S. Cl. 260—326.5 FL 6 Claims

1. An improved process for the purification of 2-hydroxyethylpyrrolidone comprising:

a. heating a reaction mixture containing crude 2-hydroxyethylpyrrolidone, N-(hydroxyethyl)- 4-hydroxybutyramide, excess 2-aminoethanol and unreacted butyrolactone to a temperature within the range of from about 180°C to about 240°C, thereby dehydrating said N-(hydroxyethyl)-4-hydroxybutyramide, which thereupon cyclizes to form desired 2-hydroxyethylpyrrolidone;

b. withdrawing a vapor stream containing water vapor, butyrolactone and 2-aminoethanol from said reaction mixture during said heating of the reaction mixture;

c. cooling said vapor stream in a partial condensation zone maintained at a temperature such as to condense butyrolactone and 2-aminoethanol vapors without condensation of said water vapor;

d. withdrawing said uncondensed water vapor from the partial condensation zone; and
e. recycling condensed butyrolactone and 2-aminoethanol to said reaction mixture.

3,875,185
PROCESS FOR THE PRODUCTION OF 2-HYDROXYETHYLPYRROLIDONE

Eugene Victor Hort, Piscataway, N.J., assignor to GAF Corporation, New York, N.Y.

Filed July 27, 1972, Ser. No. 275,550
Int. Cl. C07d *27/08*
U.S. Cl. 260—326.5 FL **6 Claims**

1. An improved process for the production of 2-hydroxyethylpyrrolidone comprising:
a. mixing butyrolactone and an excess of 2-aminoethanol to form N-(hydroxyethyl)-4-hydroxybutyramide;
b. heating the resulting reaction mixture of butyrolactone, 2-aminoethanol and said N-(hydroxyethyl)-4-hydroxybutyramide to a temperature in the range of from about 180°C to about 240°C, thereby dehydrating said N-(hydroxyethyl)-4-hydroxybutyramide, which thereupon cyclizes to form 2-hydroxyethylpyrrolidone;
c. withdrawing a vapor stream comprising water vapor, butyrolactone and 2-aminoethanol from said reaction mixture during said heating of the reaction mixture;
d. cooling said vapor stream in a partial condensation zone maintained at a temperature such as to condense butyrolactone and 2-aminoethanol vapors without condensation of said water vapor;
e. withdrawing said uncondensed water vapor from the partial condensation zone; and
f. recycling condensed butyrolactone and 2-aminoethanol to said reaction mixture.

3,875,186
PROCESS FOR THE PRODUCTION OF TETRABROMOPHTHALIC ANHYDRIDE

Hilmar Hein, Wiesbaden-Kohlheck; Karlheinz Janzon, Grossauheim; Wolfgang Weigert, Offenbach; Christa Liedtke, Bruchkobel, and Rudolf Muller, Freigericht, all of Germany, assignors to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler, Frankfurt (Main), Germany

Filed Oct. 10, 1973, Ser. No. 405,082
Claims priority, application Germany, Oct. 14, 1972, 2250550
Int. Cl. C07c *63/14*
U.S. Cl. 260—346.3 **9 Claims**

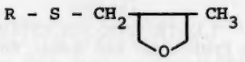
1. A process for the production of tetrabromophthalic anhydride comprising brominating phthalic anhydride at elevated temperature in the presence of sulfuric acid and a bromination catalyst using bromine and hydrogen peroxide as the brominating agent.

3,875,187
3-MERCAPTOMETHYL AND 3-ORGANOTHIOMETHYL--METHYL

Richard A. Hickner; Corwin J. Bredeweg, and Raymond A. Plepys, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 794,411, Jan. 27, 1969, Pat. No. 3,682,965. This application May 12, 1972, Ser. No. 252,625
Int. Cl. C07d *5/04*
U.S. Cl. 260—347.2 **5 Claims**

1. A compound having the formula



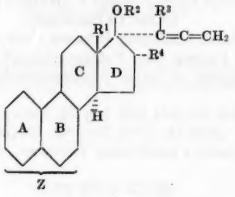
wherein R is H, alkyl having up to eighteen carbon atoms, carboxyalkyl of the type $—CH_2—_nCOOR_2$ where R_2 is H or alkyl having up to 12 carbon atoms and n is 1–4, allyl, phenyl, phenalkyl having up to sixteen carbon atoms, or a halo- or hydroxy-substituted group of the foregoing types.

3,875,188
17-BETA-ALPHA-LOWER ALKYL ALLENE-SUBSTITUTED STEROIDS

Eugene E. Galantay, Rt. 18, Kemble Lake, Morristown, N.J. 07960

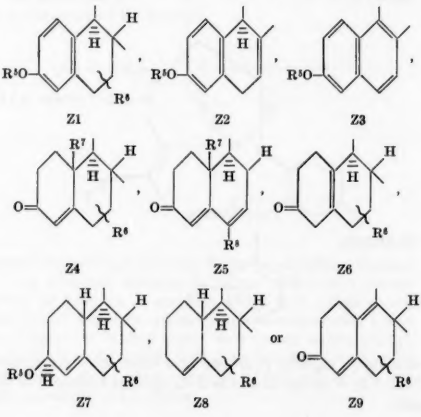
Continuation-in-part of Ser. No. 720,342, April 10, 1968, Pat. No. 3,541,210. This application Sept. 12, 1968, Ser. No. 759,516
Int. Cl. C07c *169/08*
U.S. Cl. 260—397.4 **31 Claims**

1. A compound of the formula



(I)

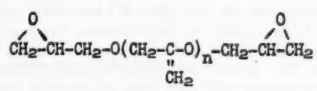
where
R^1 is alkyl having 1 to 3 carbon atoms;
R^2 is H, methyl or lower alkanoyl having 2 to 4 carbon atoms;
R^3 is alkyl having 1 to 3 carbon atoms
R^4 is H, hydroxy, or lower alkanoyloxy and
Z embracing rings A and B and the substituents thereon is



where
R^5 is H, lower alkyl having 1 to 3 carbon atoms, cycloalkyl, or lower alkanoyl having 2 to 4 carbon atoms,
R^6 is H, 6α-methyl or 7α-methyl,
R^7 is H, or methyl,
R^8 is H, halogen having an atomic weight of about 19 to 36, or methyl;
with the proviso that when Z is Z 1, and R^5 is H or lower alkanoyl, and R_6 is H, then R_4 is H.

3,875,189
HIGHLY UNSATURATED POLYETHERS
Walter L. Petty, Oakland, Calif., assignor to Shell Oil Company, New York, N.Y.
Division of Ser. No. 423,646, Dec. 31, 1964,. This application July 12, 1967, Ser. No. 660,546
Int. Cl. C07d *1/18*
U.S. Cl. 260—348 R 1 Claim

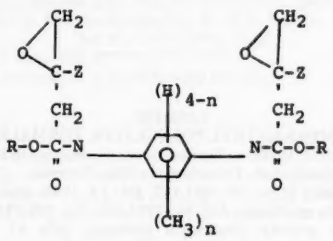
1. A polymeric highly unsaturated polyether having the formula



wherein *n* is greater than 2.

3,875,190
GLYCIDYLURETHANE COMPOUNDS, PROCESSES FOR THEIR MANUFACTURE AND THEIR USE
Jurgen Habermeier, Pfeffingen, and Daniel Porret, Binningen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.
Filed Nov. 21, 1972, Ser. No. 308,624
Claims priority, application Switzerland, Nov. 24, 1971, 17125/71
Int. Cl. C07d *1/22, 1/00*
U.S. Cl. 260—348 A 2 Claims

1. A glycidylurethane or β-methylglycidylurethanes of the formula



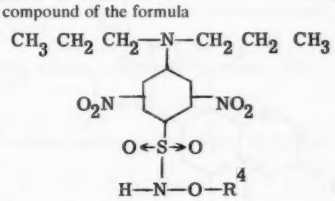
wherein Z is hydrogen or methyl, *n* is from 0 to 4, and R is an alkyl of 1 to 4 carbon atoms.

3,875,191
PROCESS FOR THE PRODUCTION AND SEPARATION OF HYDROXYLAMINO ANTHRAQUINONE ISOMERS
Istvan Toth, Bottmingen, Basel-land, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland
Filed June 14, 1972, Ser. No. 262,474
Claims priority, application Switzerland, June 17, 1971, 8817/71; June 25, 1971, 9344/71
Int. Cl. C07c *97/12*
U.S. Cl. 260—378 12 Claims

1. A process for the production of monohydroxylaminoanthraquinone or dihydroxylaminoanthraquinone, which comprises reducing a mixture (a) comprising α-mononitroanthraquinone and anthraquinone or a mixture (b) comprising α-mononitroanthraquinone and 1,5- and/or 1,8-dinitroanthraquinone so that all nitro groups of the nitro compounds are reduced to the hydroxylamino stage, to produce a mixture (*a'*) comprising α-monohydroxylaminoanthraquinone and anthraquinone or a mixture (*b'*) comprising α-monohydroxylaminoanthraquinone and 1,5- and/or 1,8-dihydroxylaminoanthraquinone, partially dissolving the resulting reaction mixture in an aqueous alkali-metal basic medium to dissolve only the more soluble monohydroxylaminoanthraquinone component of mixture (*a'*) or only the more soluble dihydroxylaminoanthraquinone component of mixture (*b'*) and separating the dissolved hydroxylamino component from the undissolved components of the reaction mixture.

3,875,192
N'-ALKOXY SULFANILAMIDES
Robert G. Suhr, Greenfield, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.
Filed Nov. 13, 1972, Ser. No. 306,129
Int. Cl. C07c *143/80*
U.S. Cl. 260—397.7 R 4 Claims

1. A compound of the formula



wherein R^4 represents methyl, ethyl or *n* -butyl.

3,875,193
PREPARATION OF HYDROXYLATED STEROIDS
Yehuda Mazur, Tel-Aviv, and Avner Rotman, Rehovot, both of Israel, assignors to Yeda Research and Development Co., Ltd., Rehovot, Israel
Filed Apr. 5, 1973, Ser. No. 348,229
Claims priority, application Israel, Apr. 9, 1972, 39165
Int. Cl. C07c *169/48*
U.S. Cl. 260—397.1 1 Claim

1. A process for preparing the 14β-hydroxy derivative of aethiocholanic acid methyl ester-3-acetate which comprises dissolving aethiocholanic acid methyl ester-3-acetate in a suitable solvent therefor together with peracetic acid to form a reaction mixture, subjecting the reaction mixture to heating or irradiation with ultraviolet light having a wavelength below 350 mμ, and separating the desired 14β-hydroxy derivative from the reaction mixture.

3,875,194

PROCESS FOR THE PREPARATION OF PREGNANOIC ACID DERIVATIVES

Henry Laurent, and Rudolf Wiechert, both of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

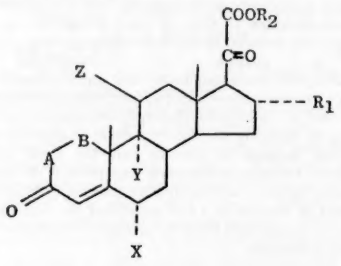
Filed Dec. 5, 1973, Ser. No. 421,820

Claims priority, application Germany, Dec. 6, 1972, 2260303

Int. Cl. C07c *167/18*

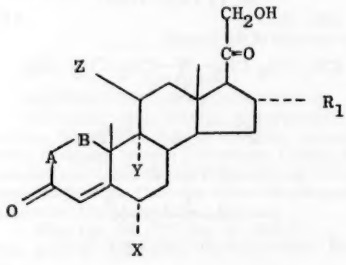
U.S. Cl. 260—397.1 **17 Claims**

1. A process for the production of pregnanoic acid derivatives of the formula

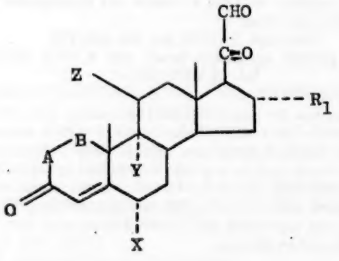


wherein —A—B— is $-CH_2-CH_2-$, —CH=CH—, or —CCl=CH; X is hydrogen, halogen or methyl; Y is hydrogen or halogen; Z is hydroxy or a halogen having an atomic weight the same as or lower than Y; R_1 is hydrogen atom or methyl; and R_2 is alkyl of 1–12 carbon atoms, cycloalkyl of 3–12 ring carbon atoms, mono or dicyclic aryl of up to 12 ring carbon atoms, phenylalkyl or alkylphenyl, which comprises

i. reacting a 21-hydroxy steroid of the formula



wherein —A—B—, X, Y, Z, and R_1 have the values given above, with an alcohol of the formula R_2OH wherein R_2 has the values given above, in the presence of a water soluble copper(II) salt of an acid to form the corresponding steroid aldehydes or hydrates or hemiacetals thereof, of the formula



wherein —A—B—, X, Y, Z, and R_1 have the above-indicated values, and

ii. oxidizing said aldehyde, hydrate or hemiacetal with an oxidizing oxide of a metal of Groups Ia, IIa, IVa, VIb and VIIb in the lower half of the Periodic Table having an oxidation potential of at least + 0.50 in the presence of an alcohol and as catalyst for the oxidation, an alkali metal cyanide, to form the corresponding pregnanoic acid derivative.

3,875,195

REDUCTION OF 3-KETO-5 BETA-H STEROIDS TO 3 BETA-HYDROXY-5BETA-H STEROIDS

Robert C. Nickolson, Ulrich Kerb, and Rudolf Wiechert, Berlin, both of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Filed Nov. 15, 1973, Ser. No. 416,095

Claims priority, application Germany, Nov. 18, 1972, 2257132

Int. Cl. C07c *169/20, 169/32*

U.S. Cl. 260—397.4 **6 Claims**

1. In a process for the reduction of 3-keto-5β-H steroids to 3-hydroxy-5β-H steroids the improvement which comprises reducing a 3-keto-5β-H steroid having an angular methyl group at the 10— position and otherwise unsubstituted A and B rings in cis-linkage with each other substantially entirely to a 3β-hydroxy-5β-H steroid by conducting the reduction in a lower carboxylic acid with Raney nickel and hydrogen under pressure.

3,875,196

PROCESS FOR PREPARING PHOSPHORIC ACID ESTERS OF FATTY ACID MONO- OR DI-GLYCERIDES

Takashi Meguro, Zushi; Hironori Takashashi, Kawasaki, and Kazuko Arai, Tokyo, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Dec. 28, 1971, Ser. No. 213,216

Claims priority, application Japan, Dec. 28, 1970, 45-128858

Int. Cl. A23j *7/00;* **C07f** *9/02*

U.S. Cl. 260—403 **4 Claims**

1. A process for producing phosphoric acid esters of fatty acid mono- or diglycerides which comprises reacting a mono- or diglyceride ester of stearic acid, myristic acid, palmitic acid, palmitoleic acid or a mixed acid ester thereof with a polyphosphoric acid.

3,875,197

AMIDO-METHYL-POLYGLYCOL FORMALS

Heiss Lorenz, Hofheim, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, am Main, Germany

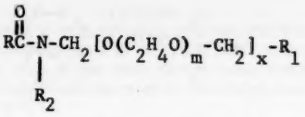
Continuation of Ser. No. 841,112, July 11, 1969, abandoned. This application July 31, 1972, Ser. No. 276,812

Claims priority, application Germany, July 15, 1968, 1768928

Int. Cl. C09f *1/00*

U.S. Cl. 260—404 **10 Claims**

1. An amido-methyl-polyglycol formal of the formula



wherein R represents alkyl or alkenyl of 8 to 21 carbon atoms, R_1 represents the hydroxyl group or the radical

R_2 represents hydrogen or one of the radicals $-CH_2OH$ or $-CH_2[O(C_2H_4O)_m-CH_2]_x-R_1$ and m and x represent an integer of 1 to 20.

3,875,198

SUN-SCREENING COMPOUNDS I

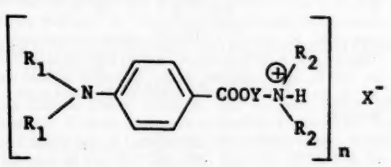
Albert Frederick Strobel, Delmar, N.Y., assignor to GAF Corporation, New York, N.Y.

Filed Apr. 29, 1974, Ser. No. 465,247

Int. Cl. C11c *3/00*

U.S. Cl. 260—404.5 **16 Claims**

1. A compound of the formula:



where R_1 and R_2 are independently straight or branched chain lower alkyl; Y is C_2–C_6 alkylene; X is $R_3—COO^-$, $HOOC—R_4—COO^-$ or $^-OOC—R_4—COO^-$, where R_3 is alkyl of 1 to 18 carbon atoms and R_4 is alkylene of 1 to 18 carbon atoms; and n is 1 when X is $R_3—COO^-$ or $HOOC—R_4—COO^-$ or n is 2 when X is $^-OOC—R_4—COO^-$.

3,875,199

METAL 1,2 DITHIOLENES

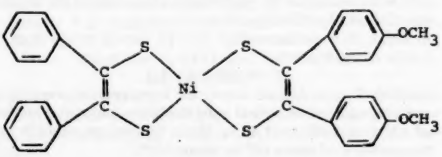
Stanley Morton Bloom, Waban, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 60,982, July 6, 1970, Pat. No. 3,687,862, which is a division of Ser. No. 577,576, Sept. 2, 1966, Pat. No. 3,588,216. This application May 8, 1972, Ser. No. 251,284

Int. Cl. C07f *15/00, 15/04*

U.S. Cl. 260—429 R **5 Claims**

1. A compound of the following formula:



3,875,200

NEW BIS-2-AZOMETHINE PIGMENTS, PROCESS FOR THEIR MANUFACTURE AND THEIR USE

Francois L'Eplattenier, Therwil; Andre Pugin, Riehen, and Laurent Vuitel, Therwil, all of Switzerland, assignors to Ciba-Geigy Corp., Ardsley, N.Y.

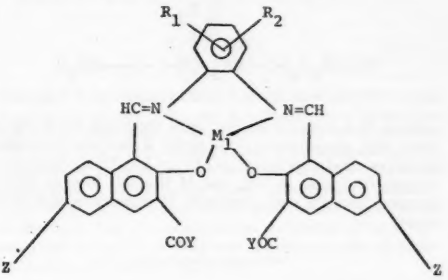
Filed June 13, 1973, Ser. No. 369,671

Claims priority, application Switzerland, June 19, 1972, 9190/72

Int. Cl. C07f *15/04, 3/08, 1/08*

U.S. Cl. 260—439 R **3 Claims**

1. A bis-azomethine pigment of the formula



wherein M_1 is nickel, copper, zinc or cadmium, R_1 and R_2 are hydrogen, chloro, lower alkyl, lower alkoxy, phenyl, phenoxy, or wherein R_1 and R_2 together form a fused benzene ring, Y is amino, alkylamino or arylamino and Z is hydrogen, chloro, or lower alkoxy.

3,875,201

DIALKOXYXANTHOGENDISULPHIDES

Rudolf Mayer-Mader, Koeln, and Jurgen Boldt, Opladen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

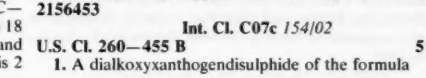
Filed Nov. 9, 1972, Ser. No. 305,133

Claims priority, application Germany, Nov. 13, 1971, 2156453

Int. Cl. C07c *154/02*

U.S. Cl. 260—455 B **5 Claims**

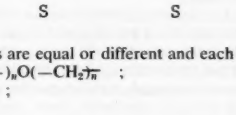
1. A dialkoxyxanthogendisulphide of the formula



wherein the R's are equal or different and each represents

$R_1O(—CH_2—)_nO(—CH_2\overline{)_{n'}}$;

$R_1O — R_2 —$;



$R_3O(—CH_2\overline{)_m}$

wherein

R_1 is alkyl having 1 to 10 carbon atoms;

R_2 is linear or branched alkylene having 3 to 10 carbon atoms;

R_3 is alkyl having 3 to 10 carbon atoms;

n and n' are 2, 3 or 4; and

m is 1 or 2.

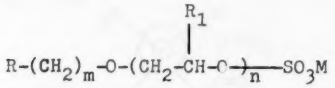
3,875,202

SULFATES OF MONOETHYLENICALLY UNSATURATED ALCOHOLS AND THE ALKENOXYLATED ADDUCTS OF SAID ALCOHOLS

Robert Steckler, Crofton, Md., assignor to Alcolac Inc., Baltimore, Md.

Filed Jan. 5, 1973, Ser. No. 321,228
Int. Cl. C07c 141/10
U.S. Cl. 260—458 7 Claims

1. A polymerizable monomer having the following general formula:



wherein R is a radical selected from the group consisting of vinyl, allyl, propenyl and isopropenyl, R_1 is either hydrogen, methyl or ethyl, m is an integer of from 1 to 10, n is a numeral ranging from zero to 100, and M is a salt forming cation selected from the class consisting of ammonium and alkali metal.

3,875,203

((TRICHLORONIT ROPHENYL)THIO)ACETONITRILES

R. Garth Pews; Christian T. Goralski, both of Midland, and George A. Burk, Bay City, all of Mich., assignors to The Dow Chemical Co., Midland, Mich.

Filed July 12, 1973, Ser. No. 378,461
Int. Cl. C07c 121/52
U.S. Cl. 260—465 G 4 Claims

1. ((2,3,6-Trichloro-4-nitrophenyl)thio)acetonitrile, ((2,3,4-trichloro-6-nitrophenyl)thio)acetonitrile and mixtures thereof.

3,875,204

PROCESS FOR THE PRODUCTION OF ACRYLONITRILE

Marcello Ghirga, Bresso, and Gian Fausto Buzzi, Arona, both of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed July 18, 1973, Ser. No. 380,525
Claims priority, application Italy, Aug. 1, 1972, 27740/72
Int. Cl. C07c 121/02
U.S. Cl. 260—465.3 6 Claims

1. Process for the production of acrylonitrile by reaction of propylene with ammonia and oxygen or gases containing free oxygen in the presence of metal oxide catalysts containing iron, bismuth, molybdenum, and possibly phosphorus, characterized in that a metal oxide catalyst consisting of a mixture of the oxides of bismuth, zirconium, iron, molybdenum, vanadium, and possibly phosphorus in the atomic ratio

$$Bi_{4\text{-}9}Zr_{1\text{-}4}Fe_{0.5\text{-}2}Mo_{12}V_{0.01\text{-}1}P_{0\text{-}2}O_{45\text{-}68}$$

is used, said elements being present solely as the oxides supported on silicon dioxide.

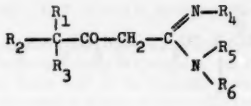
3,875,205

CYANOALKYL SUBSTITUTED-3-OXO-ALKAMIDINES

Wilhelm Heffe, Neuenegg, Switzerland, assignor to Sandoz-Wander Inc., Hanover, N.J.

Filed June 4, 1973, Ser. No. 366,681
Claims priority, application Switzerland, June 7, 1972, 8443/72; Feb. 28, 1973, 2917/73
Int. Cl. C07c 121/42, 121/66
U.S. Cl. 260—465.5 R 8 Claims

1. A compound of the formula



wherein

R_1 is alkyl of 1 to 4 carbon atoms, phenyl or phenyl substituted with alkyl of 1 to 4 carbon atoms or chloro,

R_2 is alkyl of 1 to 4 carbon atoms, or

R_1 and R_2 together are $—(CH_2)_n—$, wherein n is an integer from 2 to 7, and

R_3 is alkyl of 1 to 4 carbon atoms, or

R_1, R_2 and R_3 together with the carbon atom to which they are bound form the adamantyl radical,

R_4 is alkyl of 1 to 8 carbon atoms, alkenyl of 2 to 8 carbon atoms, alkoxyalkyl of 2 to 8 carbon atoms in the aggregate thereof, cyanoalkyl wherein the alkyl radical is of 1 to 5 carbon atoms, or a group of formula

wherein

R_7 and R_8 are the same or different and each is alkyl of 1 to 4 carbon atoms, and

R_5 and R_6 are the same or different and each is alkyl of 1 to 8 carbon atoms, alkenyl of 2 to 8 carbon atoms, alkoxyalkyl of 2 to 8 carbon atoms in the aggregate thereof or cyanoalkyl wherein the alkyl is of 1 to 5 carbon atoms, or one of R_4, R_5 and R_6 is phenyl or phenyl substituted with alkyl of 1 to 4 carbon atoms or halo and the others of R_4, R_5 and R_6 are as defined above, provided at least one of R_4, R_5 and R_6 is cyanolkyl wherein the alkyl is of 1 to 5 carbons.

3,875,206

PROCESS FOR PREPARING NITRIC ACID ESTERS OF 1,1,2,2-TETRAHYDRO-PERFLUORO-ALKANOLS

Erich Schuierer; Klaus Ulm, both of Burghausen; Siegfried Rebsdat, Altotting, and Ignaz Wimmer, Unternau, Post Office Neuotting, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Main, Germany

Division of Ser. No. 150,770, June 7, 1971, Pat. No. 3,824,296
Filed Mar. 4, 1974, Ser. No. 447,984
Claims priority, application Germany, June 10, 1970, 2028459
Int. Cl. C07c 77/02
U.S. Cl. 260—467 9 Claims

1. In a process for the preparation of an ester of the formula

$$R_f—CH_2—CH_2—ONO_2$$

in which R_f is perfluoroalkyl of 4 16 carbon atoms from an iodide of the formula

$$R_f13\ CH_2—I$$

in which R_f is as defined above, the improvement comprising. reacting said iodide with at least the three-fold molar amount of nitric acid of about 85 to about 98 percent strength at a temperature of about 60° to about 100°C.

3,875,207

PROCESS FOR THE TEMPORARY PROTECTION OF AMINO GROUPS IN PEPTIDE SYNTHESES

Beat Iselin, Riehen, and Peter Sieber, Reinach/Basel-Land, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

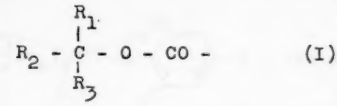
Continuation-in-part of Ser. No. 698,118, Jan. 16, 1969, abandoned. This application Mar. 30, 1972, Ser. No. 239,721

Claims priority, application Switzerland, Jan. 25, 1967, 1073/67; Aug. 28, 1967, 12038/67; Nov. 6, 1967, 17108/67

Int. Cl. C07c *103/52, 117/00, 103/20*

U.S. Cl. 260—471 C **18 Claims**

1. Process for the temporary protection of amino groups in peptide syntheses by acylating the amino group and then eliminating the acyl group introduced, wherein the protective group used is the group of the formula I



(I)

in which R_1 represents lower alkyl, R_2 lower alkyl or phenyl, and R_3 stands for phenyl, and wherein the phenyl radicals are unsubstituted or substituted by lower alkyl, phenyl or lower alkylphenyl groups.

3,875,208

META-AND PARA-PHENYLENE-BIS(4-HYDROXYMETHYLENE-PHTHALIC ACIDS AND THE DIESTER AND TETRAESTER THEREOF

Choua Cohen; Pierre Giuliani, and Bernard Sillion, all of Grenoble, France, assignors to Institut Francais du Petrole des Carburants et Lubrifiants, Rueil-Malmaison, France

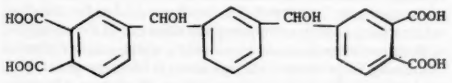
Division of Ser. No. 281,196, Aug. 16, 1972, Pat. No. 3,793,291, which is a continuation-in-part of Ser. No. 9,409, Feb. 6, 1970, abandoned. This application Aug. 31, 1973, Ser. No. 393,334

Claims priority, application France, Feb. 10, 1969, 69.03109

Int. Cl. C07c *69/78*

U.S. Cl. 260—473 R **2 Claims**

1. Meta-phenylene bis(4-hydroxymethylene phthalic acid) of the formula



3,875,209

ESTERIFICATION OF CARBOXYLIC ACIDS BY REACTION WITH O-LOWER ALKYL IMINO ETHERS

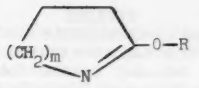
Ernest Mohacsi, Nutley, and Willy Leimgruber, Montclair, both of N.J., assignors to Hoffman-La Roche Inc., Nutley, N.J.

Filed May 3, 1973, Ser. No. 356,868

Int. Cl. C07c *69/78*

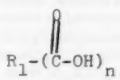
U.S. Cl. 260—473 S **8 Claims**

1. A process for preparing an ester comprising: reacting a carboxylic acid with an O-lower alkyl imino ether of the formula:



wherein R is an unsubstituted lower alkyl and *m* is an integer of 1 to 3;

wherein said carboxylic acid is of the formula:



wherein *n* is an integer of from 1 azulyl. to 4 inclusive and is equal to the valence of R_1; and R_1 is hydrogen, substituted or unsubstituted alkyl having from 1 to 20 carbon atoms, cycloalkyl having from 3 to 20 carbon atoms, unsubstituted or substituted alkenyl having from 2 to 20 carbon atoms, cycloalkenyl having from 3 to 20 carbon atoms, substituted or unsubstituted alkynyl having from 2 to 20 carbon atoms, cycloalkynyl having from 3 to 20 carbon atoms, unsubstituted or substituted aryl selected from the group consisting of phenyl, naphtyl, anthryl, phenanthyl and azulyl

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3,875,210

ALUMINUM POWDER AS AN ESTERIFICATION CATALYST

Ronald J. Golembeski, Corapolis, Moon Township, Allegheny County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed May 14, 1973, Ser. No. 359,942

Int. Cl. C07c *69/60, 69/80*

U.S. Cl. 260—475 R **5 Claims**

1. Method of reacting an anhydride of a dicarboxylic acid with a lower alcohol having one hydroxyl group and from 4 to 13 carbon atoms to obtain an ester, comprising reacting the anhydride and the alcohol in the presence of an aluminum powder catalyst and an alkali metal hydroxide.

3,875,211

PROCESS FOR PREPARING 2-HYDROXYALKYLACRYLATES AND -HYDROXYALKYLMETHACRYLATES

Robert Steckler, Crofton, Md., assignor to Alcolac Inc., Baltimore, Md.

Filed Jan. 22, 1973, Ser. No. 325,840

Int. Cl. C07c *69/54*

U.S. Cl. 260—486 B **16 Claims**

1. In the process of preparing a compound selected from the group consisting of 2-hydroxyalkylacrylates and 2-hydroxyalkylmethacrylates by the reaction of an acid selected from the group consisting of acrylic acid and methacrylic acid with a vicinal alkylene oxide having 2 to 4 carbon atoms; the improvement which comprises: carrying out said reaction in the presence of a small amount of a Werner-type chromium (III) complex wherein an organic acid selected from the group consisting of (a) fatty acids of from 6 to 22 carbon atoms; and (b) salicylic acids and naphthoic acids having a hydroxyl group in ortho position to the carboxyl group are coordinated with chromium (III), as a catalyst; and from 0 to about 1 percent, by weight of said acid, of a polymerization inhibitor for said acid.

3,875,212
PROCESS FOR CONTINUOUSLY SYNTHESIZING ACRYLIC ACID ESTERS

Tetsuya Ohrui, Niihama; Yasuhito Sakakibara, Saijo; Yukinaga Aono; Michio Kato; Hiroshi Takao, and Tsunejiro Kawaguchi, Niihama, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed May 21, 1973, Ser. No. 362,202
Int. Cl. C07c *69/54*
U.S. Cl. 260—486 R **11 Claims**

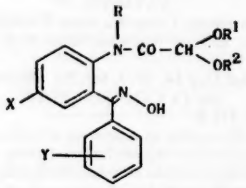
1. A process for continuously synthesizing acrylic acid esters by a sulfuric acid catalyst, which comprises: 1. esterifying acrylic acid with methanol or ethanol in the presence of a water-insoluble and unreactive organic solvent selected from the group consisting of linear, cyclic and aromatic hydrocarbons having a boiling point of from 100°to 160°C., while azeotropically boiling water formed in the esterification together with the organic solvent and distilling acrylic acid esters simultaneously, thereby keeping the concentration of sulfuric acid constant in the esterification solution; 2. separating the resulting effluent esterification solution into an organic solvent layer and an aqueous layer by decantation;

3,875,213
INTERMEDIATES FOR THE SYNTHESIS OF 1,4-BENZODIAZEPIN-2-ONES

Ronald J. McCaully, 1 Limekiln Dr., Malvern, Pa. 19355

Division of Ser. No. 294,724, Oct. 3, 1972,. This application Jan. 30, 1974, Ser. No. 438,114
Int. Cl. C07c *131/00*
U.S. Cl. 260—490 **5 Claims**

1. A compound of the formula



wherein R is hyrogen or alkyl of from 1 to 6 carbon atoms, R^1 and R^2 may be the same or different and are alkanoyl of from 1 to 6 carbon atoms, and X and Y may be the same or different and are selected from the group consisting of hydrogen, halogen, nitro, trifluoromethyl, thiomethyl, cyano, alkyl of from 1 to 6 carbon atoms and alkoxy of from 1 to 6 carbon atoms.

3,875,214
PROCESS FOR ISOLATING PGA_2 ACETATE METHYL ESTER AND ITS 15-BETA EPIMER

William P. Schneider, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 159,525, July 2, 1971, abandoned, which is a continuation-in-part of Ser. No. 71,392, Sept. 11, 1970, abandoned. This application Oct. 25, 1973, Ser. No. 409,691
Int. Cl. C07c *67/06*
U.S. Cl. 260—499 **15 Claims**

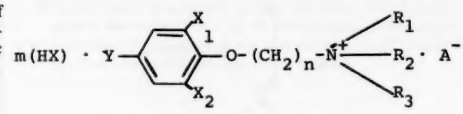
1. In a process for extracting 15β-PGA_2 acetate methyl ester from colonies or colony pieces of the marine invertebrate Plexaura homomalla (Esper), 1792, forma R, or in a process for extracting PGA_2 acetate methyl ester from colonies or colony pieces of the marine invertebrate Plexaura homomalla (Esper), 1792, forma S, the improvement wherein said colonies or colony pieces are frozen within one hour after removal of said colonies from their growing site, said colonies or colony pieces being maintained in a frozen state until the time they are extracted with a neutral organic liquid.

3,875,215
SUBSTITUTED PHENOXYALKYL QUATERNARY AMMONIUM COMPOUNDS

Stanley J. Strycker, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed July 19, 1971, Ser. No. 164,086
Int. Cl. C07c *93/14*
U.S. Cl. 260—501.15 **10 Claims**

1. A quaternary ammonium compound corresponding to the formula:



wherein Y represents amino or diloweralkylamino; R_1 and R_2 represent lower alkyl; R_3 represents lower alkenyl or lower alkynyl; X_1 and X_2 both represent halogen; A^- represents a stoichiometric equivalent quantity of a pharmaceutically acceptable anion; n represents one of the integers 2, 3 or 4; HX represents a stoichiometric equivalent quantity of a pharmaceutically acceptable acid; and m represents one of the integers zero and one.

3,875,216
PROCESS FOR ISOLATING R-SALT AND INTERMEDIATE PRODUCT

Martin Louis Feldman, E. Brunswick; Donald William Hagedorn, Roxbury Township, Morris County, and John Edson Gordon, Bridgewater Township, Somerset County, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Oct. 6, 1972, Ser. No. 295,756
Int. Cl. C07c *143/00*
U.S. Cl. 260—512 C **1 Claim**

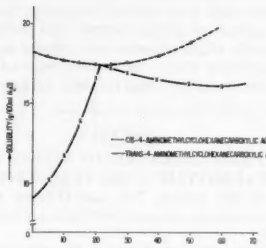
1. A method for obtaining the disodium salt of 2-naphthol-3,6-disulfonic acid from a sulfonation mass resulting from the sulfonation of betanaphthol with concentrated sulfuric acid and comprising 2-naphthol-3,6-disulfonic acid as the principal sulfonation product, comprising the steps of (1) dissolving the sulfonation mass in water to provide a water solution thereof containing from about 0.005 to about 0.04 gram moles of 2-naphthol-3,6-disulfonic acid per 100 cc. of solution, (2) reacting the water solution at about 70°–90°C. with from about 0.5 to about 3 gram moles of aniline per gram mole of 2-naphthol-3,6-disulfonic acid in said solution in the presence of a sufficient amount of sodium hydroxide or a water-soluble sodium salt selected from sodium sulfate, sodium carbonate and sodium chloride to provide from about 0.1 to about 0.4 gram moles of sodium ions in said solution, (3) cooling the solution to a temperature below about 45°C. whereby the tri-sodium mono-aniline salt of the 2-naphthol-3,6-disulfonic acid is formed as a precipitate in said solution, (4) separating the precipitate from the solution, (5) reacting the precipitate, in the presence of water, with sodium hydroxide to convert the tri-sodium mono-aniline salt of the 2-naphthol-3,6-disulfonic acid to the di-sodium salt, (6) removing the free aniline formed in step 5 by steam distillation and (7) separating the di-sodium salt from the water.

3,875,217

PROCESS FOR THE PURIFICATION OF TRANS-4-AMINOMETHYL-CYCLOHEXANE CARBOXYLIC ACID

Kikuji Suzuki; Hiroki Kuroda, and Saburo Nabeta, all of Tokyo, Japan, assignors to Daiichi Seiyaku Co., Ltd., Tokyo, Japan

Division of Ser. No. 216,200, Jan. 7, 1972,. This application Apr. 30, 1973, Ser. No. 355,874
Int. Cl. C07c *101/07*
U.S. Cl. 260—514 J 1 Claim



1. Crystalline trans-4-aminomethylcyclohexane carboxylic acid . $3H_2O$.

3,875,218

AROMATIC CARBOXYLIC ACID DISPROPORTIONATION

Yu-Lin Wu, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 156,981, June 25, 1971, Pat. No. 3,776,930. This application Apr. 27, 1973, Ser. No. 355,003
Int. Cl. C07c *63/00, 63/26*
U.S. Cl. 260—515 P 5 Claims

1. A disproportionation process for the conversion of an alkali metal salt of an aromatic carboxylic acid to an aromatic polycarboxylate containing at least one additional carboxyl group wherein a slurry comprised of an alkali metal salt of an aromatic carboxylic acid, a disproportionation catalyst comprised of a metal salt of an aromatic carboxylic acid, said metal being selected from the group consisting of zinc, cadmium, mercury, lead and iron, and an inert high-boiling organic dispersant selected from the group consisting of polyaromatic compounds having two or more aromatic rings, polynuclear aromatics and mixtures thereof is subjected to heating in a disproportionation zone at an elevated temperature so as to comprising said aromatic polycarboxylate, spent catalyst and said dispersant is contacted with water and wherein there is recovered a mixture comprised of said spent catalyst comprised of an oxide of said metal and dispersant and wherein said mixture of spent catalyst and dispersant is thereafter contacted with an aromatic carboxylic acid so as to form a slurry comprised of a disproportionation catalyst and dispersant, and thereafter recycling said slurry of disproportionation catalyst and dispersant to said disproportionation zone wherein in said disproportionation zone said metal salt and said dispersant constituents of said slurry are catalyst and dispersant, respectively, for said disproportionation.

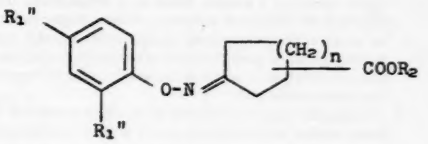
3,875,219

PHENOXYIMINO CARBOXYLIC ACIDS AND ESTERS

Leo Berger, 7 The Parkway; Willy Leimgruber, 166 Highland Ave., both of Montclaire, N.J., and Fausto Eugenio Schenker, 45 Im Hirshalm, Riehen, Switzerland

Division of Ser. No. 234,375, March 13, 1972, , which is a continuation-in-part of Ser. No. 128,570, March 26, 1971, abandoned. This application Nov. 23, 1973, Ser. No. 418,714
Int. Cl. C07c *101/36*
U.S. Cl. 260—518 R 3 Claims

1. A compound of the formula



wherein R_1'' is hydrogen, nitro or trifluoromethyl, and provided that at least one of R_1'' is other than hydrogen; R_2 is hydrogen or lower alkyl; and n is 1 or 2.

3,875,220

PROCESS FOR THE PREPARATION OF METHACRYLIC ACID FROM METHACROLEIN

James F. White, Shaker Heights, and James R. Rege, Kent, both of Ohio, assignors to The Standard Oil Co., Cleveland, Ohio

Filed Oct. 11, 1973, Ser. No. 405,309
Int. Cl. C07c *57/04, 51/30*
U.S. Cl. 260—530 N 7 Claims

1. In the process for the preparation of methacrylic acid from methacrolein by reacting methacrolein with molecular oxygen at a temperature of about 200° to about 500°C. in the presence of a catalyst and optionally in the presence of steam, the improvement comprising

using a catalyst consisting essentially of phosphorous, vanadium, molybdenum and oxygen, said catalyst having the formula

$$P_a V_b Mo_{12} O_x$$

wherein

a is a positive number less than about 6;

b is about 0.1 to about 12;

x is the number of oxygens required by the valance states of the other elements present; and

wherein at least some of the molybdenum in the catalyst is maintained at a valence state below +6;

said catalyst optionally containing one or more elements selected from the group consisting of bismuth, arsenic, boron, cerium, chromium, silver, iron, tungsten, nickel, niobium, lead, manganese, thallium, tellurium, tin or copper.

3,875,221

PROCESS FOR THE COMMERICAL PREPARATION OF LOWER AMINO ACIDS

Nobutake Mihara; Osamu Furuya, and Koichi Wada, all of Yokohama, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed July 6, 1973, Ser. No. 377,031
Claims priority, application Japan, Aug. 8, 1972, 47-78756
Int. Cl. C07c *101/06, 101/08*
U.S. Cl. 260—534 R 1 Claim

1. A process for preparing a lower amino acid selected from the group consisting of glycine and alpha-alanine, said process comprising carrying out in successively disposed vessels, in combination, the step of

1. feeding continuously to a reactor an aqueous cyanohydrin solution of a member selected from the group consisting of glycolonitrile and lactonitrile, and at least about 3 mols of gaseous ammonia per each mol of said cyanohydrin and carrying out the reaction at a temperature below

about 70°C. under autogenous pressure to obtain a reaction solution containing the corresponding glycinonitrile or alpha-aminopropionitrile, while in the meantime transferring the reaction solution successively to a separate vessel, where the pressure is released and reverted to normal atmospheric pressure, and recycling to the foregoing reaction the excess ammonia gas that is flashed thereby;

2. contacting the aqueous solution of glycinonitrile or alpha-aminopropionitrile obtained in (1) with an aqueous alkaline solution containing a stoichiometric amount or slight excess of a caustic alkali at a temperature lower than that at which said aqueous solution of glycinonitrile or alpha-aminopropionitrile boils, under normal atmospheric pressure or slightly less to obtain by hydrolysis an aqueous solution of an alkali metal salt of the corresponding lower amino acid;
3. treating the aqueous solution of an alkali metal salt of a lower amino acid obtained in (2) with a stoichiometric amount of a reagent selected from the group consisting of sulfuric acid, hydrochloric acid and the ammonium salts thereof to obtain an aqueous solution containing the corresponding free lower amino acid and alkali metal salt of a mineral acid; and
4. submitting the aqueous solution obtained in (3) to fractional crystallization in the presence of ammonia to isolate and recover the lower amino acid.

3,875,222

PROCESS FOR THE PRODUCTION OF MALIC ACID

Ferdinand Weinrotter; Alfred Schmidt, both of Linz/Danube, Austria, and Wolfgang Gauster, Lisse, Netherlands, assignors to Osterreichische Stickstoffwerke Aktiengesellschaft, Linz/Donau, Austria

Filed June 29, 1973, Ser. No. 374,887

Claims priority, application Austria, July 25, 1972, 6367/72; Germany, July 31, 1972, 2237685

Int. Cl. C07c *59/12*

U.S. Cl. 260—535 P **9 Claims**

1. A process for the preparation of pure malic acid, suitable for consumption in food and drink, from an aqueous solution obtained by the addition of water to maleic acid and/or fumaric acid under pressure and at an elevated temperature, which comprises treating the crude malic acid solution obtained after removing the fumaric acid which has crystallised out, in a liquid-liquid extraction, with an organic solvent which is immiscible with the malic acid solution and possesses good solvent power for maleic acid and fumaric acid, but in which the malic acid is so much less soluble that the distribution coefficient $Dc = C_{water}/C_{solvent}$ of malic acid bears a ratio of at least 4:1 to that of maleic acid, and subsequently isolating the malic acid from the purified solution.

3,875,223

PROCESS FOR PRODUCING DL-TARTARIC ACID

Eiichi Yonemitsu, Kashiwa; Hiroshi Miyamori, Matsudo; Takanari Nawata, Katsushika; Mutsuhiko Takeda, Matsudo, and Yukio Sasaki, Katsushika, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Jan. 7, 1974, Ser. No. 431,559

Claims priority, application Japan, Jan. 13, 1973, 48-6317

Int. Cl. C07c *59/14*

U.S. Cl. 260—536 **8 Claims**

1. A process for producing dl-tartaric acid, which comprises hydrolyzing epoxysuccinic acid in the presence of at least one compound selected from the group consisting of metal compounds of aluminum, iron, tin and bismuth, which is soluble in water or an aqueous solution of epoxysuccinic acid.

3,875,224

ANHYDRIDES TO IMPROVE OXIDATIVE COUPLING REACTIONS

Herman L. Finkbeiner, R.D. No. 1 Riverview Rd., Rexford, N.Y. 12148, and John B. Bush, Jr., 2040 Garden Dr., Schenectady, N.Y. 12309

Division of Ser. No. 274,670, July 24, 1972, , which is a continuation-in-part of Ser. No. 814,157, April 7, 1969, abandoned, which is a continuation-in-part of Ser. No. 742,544, July 5, 1968, abandoned. This application July 18, 1974, Ser. No. 489,660

Int. Cl. C07c *51/00*

U.S. Cl. 260—537 R **8 Claims**

1. The process whereby a C_{2-8} alkanoic acid having at least a hydrogen on the α-carbon atom is coupled through the α-carbon atom to another alkanoic acid as defined above to produce the corresponding succinic acid using a manganic salt of the alkanoic acid as an oxidative coupling agent, said process being carried out in the presence of a sufficient amount of the anhydride of the alkanoic acid present as the reactant to provide an excess of over the amount required to react with any water present in the initial reaction mixture.

3,875,225

LIQUID PHASE OXIDATION OF ESTERS TO FORM CARBOXYLIC ACIDS THEREFROM

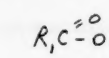
Charles C. Hobbs, Nueces, Tex., and Hendrik A. Van't Hof, Brielle, Netherlands, assignors to Celanese Corporation, New York, N.Y.

Filed Jan. 4, 1974, Ser. No. 430,835

Int. Cl. C07c *51/24*

U.S. Cl. 260—541 **9 Claims**

1. A process for the production of carboxylic acids represented by the structural formula



wherein R_1 is hydrogen or an alkyl or cycloalkyl group of from one to six carbon atoms, which process comprises

a. forming a liquid reaction mixture comprising at least one ester represented by the structural formula R_2COOR_3 wherein R_2 is hydrogen or an alkyl or cycloalkyl group of from one to six carbon atoms and R_3 is an alkyl or cycloalkyl group of from one to six carbon atoms.

or $R_6{=}0$ wherein R_4 and R_5 are the same or different alkyl groups of from one to six carbon atoms and R_6 is a cycloalkylidene group of 4–20 carbon atoms,

b. oxidizing the liquid reaction mixture in the presence of 3 to 20% water to hydrolyze the ester during the oxidation reaction at a temperature of 50°–200°C with a gas comprising molecular oxygen to form an oxygenated reaction product mixture and,
c. recovering carboxylic acid reaction product from the reaction product mixture.

3,875,226

PREPARATION OF ACID HALIDES

Harold E. Doorenbos, Midland; Darell D. Toner, Sanford, and Linda G. Calhoun, Beaverton, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 17, 1969, Ser. No. 867,377

Int. Cl. C07c *51/58*

U.S. Cl. 260—544 L **6 Claims**

1. A process for preparing organic acid halides comprising reacting by contacting in the liquid phase (a) sulfur dioxide and (b) an organic compound bearing at least one allylic or benzylic trihalomethyl group; the halogen of said trihalomethyl group being fluoro, chloro, bromo or mixtures thereof; said process being conducted in the presence of a small but catalytic amount of BF_3, BF_3.etherate, $SnCl_4$ or $ZnCl_2$ and at a temperature of from about 50°C. to about 125°C.

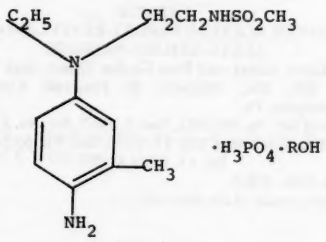
3,875,227

ALCOHOLATES OF ORTHOPHOSPHATE SALTS OF 4-AMINO, 3-METHYL, N-ETHYL, N-BETA METHANESULFONAMIDOETHYL ANILINE

Harry Kroll, Warwick, and Alderic R. Therrien, Woonsocket, both of R.I., assignors to Philip A. Hunt Chemical Corporation, Palisades Park, N.J.

Filed Feb. 23, 1973, Ser. No. 335,341
Int. Cl. C07c *143/74*
U.S. Cl. 260—556 A 8 Claims

1. A crystal orthophospate salt of 4-amino, 3-methyl, N-ethyl, N-beta-methanesulfonamidoethyl aniline containing an alcohol of crystallization and having the structure:



where ROH is an aliphatic alcohol having one to three carbon atoms selected from the group consisting of methyl alcohol, ethyl alcohol, n-propyl alcohol and isopropyl alcohol.

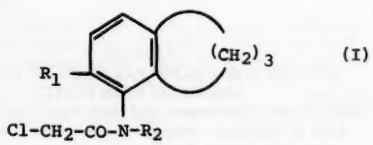
3,875,228

ACYLAMINES OF BICYCLIC HYDROCARBONS FOR THE REGULATION OF PLANT GROWTH

Paul Rathgeb, Basel, Switzerland; Jean Claude Tournayre, Lunel, France, and Christian Vogel, Binningen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 9, 1973, Ser. No. 331,168
Int. Cl. C07c *103/38*
U.S. Cl. 260—562 R 5 Claims

1. A compound of formula I



wherein R_1 represents methyl or ethyl, and R_2 represents methoxymethyl, ethoxymethyl or isopropoxymethyl.

3,875,229

SUBSTITUTED CARBOXANILIDES

Elijah H. Gold, West Orange, N.J., assignor to Schering Corporation, Bloomfield, N.J.

Continuation-in-part of Ser. No. 309,539, Nov. 24, 1972, abandoned. This application June 19, 1973, Ser. No. 371,452
Int. Cl. C07c *103/32*
U.S. Cl. 260—562 R 2 Claims

1. 2-Hydroxy-4′-nitro-3′-trifluoromethylisobutyranilide.

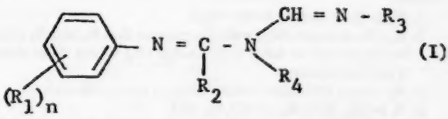
3,875,230

PESTICIDAL 1,3,5-TRIAZAPENTA-1,4-DIENES

Georg Pissiotas, Lorrach, Germany, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed June 12, 1974, Ser. No. 478,679
Claims priority, application Switzerland, June 25, 1973, 9243/73; Apr. 26, 1974, 5755/74
Int. Cl. C07c *123/00*
U.S. Cl. 260—564 RF 7 Claims

1. A 1,3,5-triazapenta-1,4-diene of the formula



wherein

R_1 is selected from the group consisting of hydrogen, halogen, alkyl, alkoxy, alkylthio, alkenyloxy, cyano, nitro, dialkylamino and carbalkoxy,

wherein the alkyl, alkoxy and alkenyl chains of said radicals contain from one to 18 carbon atoms,

n is an integer of from 1 to 5,

R_2 represents hydrogen or an alkyl radical of from one to 18 carbon atoms, and

R_3 and R_4 each represent an alkyl radical of from one to 18 carbon atoms.

3,875,231

RECOVERY OF REACTION PRODUCTS OF HYDRAZINE AND CARBONYL COMPOUNDS

Herman Brandl, Leichlingen; Hermann Kaiser, Leverkusen; Hans Richert, Leverkusen; Franz Rozanski, Leverkusen; Herbert Suchy, Leverkusen, and Theodor Hunecke, Porz-Urbach, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 11, 1971, Ser. No. 197,929
Claims priority, application Germany, Nov. 17, 1970, 2056357
Int. Cl. C07c *119/00*
U.S. Cl. 260—566 B 4 Claims

1. In the preparation of reaction products of hydrazine and acetone by reacting chlorine or compounds which contain active chlorine with ammonia in the aqueous phase and with a acetone, and thereafter recovering the hydrazine reaction product, the improvement which comprises rendering the reaction medium substantially insoluble for the resulting hydrazine-acetone compound by effecting the reaction in the presence of at least one salt selected from the group consisting of NaCl, $CaCl_2$ and KCl present in such amount that the system separates into an aqueous salt-containing phase and a substantially non-aqueous phase, separating the non-aqueous phase formed containing the reaction product of hydrazine and acetone from the substantially aqueous phase, and recycling said aqueous phase for use in the reaction of further quantities of chlorine with ammonia and acetone.

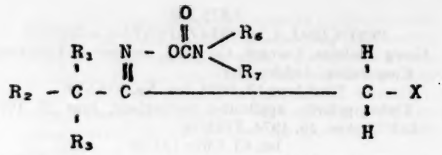
3,875,232

AC KETOXIME CARBAMATES

Thomas A. Magee, Mentor, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 132,584, April 8, 1971, abandoned. This application Feb. 24, 1972, Ser. No. 229,207
Int. Cl. C07c *131/00*
U.S. Cl. 260—566 6 Claims

1. A composition of matter having the structural formula:



where:

a. R_1 is hydrogen or lower alkyl;

b. R_2 - R_3 is lower alkyl with the proviso that R_2 and R_3 may be connected to form a cycloalkyl ring of not more than 6 carbon atoms;

c. R_6 - R_7 is hydrogen, lower alkyl or lower alkenyl;

d. X is SR_8, $S(O)R_8$ or SO_2R_8; and,

e. R_8 is hydrogen, lower alkyl, lower alkenyl, lower alkynyl, or aryl.

3,875,233

BIS-P-HYDROXY-PHENETHYL AMINES

Jean-Michel Bastian, Therwil, and Klaus Hasspacher, Riehen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

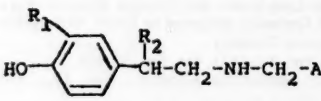
Filed Jan. 22, 1973, Ser. No. 325,877

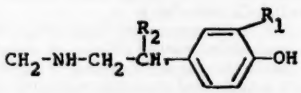
Claims priority, application Switzerland, Jan. 25, 1972, 1071/72; Feb. 4, 1972, 1698/72; Feb. 4, 1972, 1700/72; Feb. 17, 1972, 2294/72; Feb. 17, 1972, 2295/72; Apr. 24, 1972, 6034/72; May 23, 1972, 7594/72

Int. Cl. C07c *87/28*

U.S. Cl. 260—570.7 **7 Claims**

1. A compound of the formula:





wherein

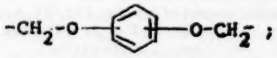
R_1 is hydroxyl or hydroxymethyl

R_2 is hydroxymethyl when R_1 is hydroxyl; or hydroxyl when R_1 is other than hydroxyl; and

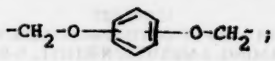
A is

i. when R_1 is hydroxyl,

wherein the ring substituents are ortho or meta to each other; or



ii. when R_1 is hydroxymethyl,



or a pharmaceutically acceptable acid addition salt thereof.

3,875,234

N-(LOWER ALKYL)-HYDROXY-BENZYL-N-LOWER ALKYL-ANILINE-N-OXIDES

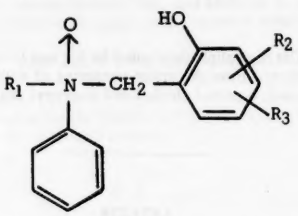
Harry Elmer Albert, and Paul Gordon Haines, both of Lafayette Hill, Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 681,093, Nov. 7, 1967, Pat. No. 3,576,877. This application July 15, 1970, Ser. No. 62,749

Int. Cl. C07c *87/28*

U.S. Cl. 260—570.9 **4 Claims**

1. Compounds of the formula:



wherein R_1 is lower alkyl; R_2 is hydrogen or lower alkyl, and R_3 is tertiary alkyl.

3,875,235

PROCESS FOR THE PREPARATION OF TERTIARY AMINES OF HIGH PURITY

Heinz Noeske, Oberhausen, and Hans Feichtinger, Dinslaken, both of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen, Germany

Filed Jan. 24, 1973, Ser. No. 326,182

Claims priority, application Germany, Feb. 9, 1972, 2205958

Int. Cl. C07c *85/06*

U.S. Cl. 260—585 B **12 Claims**

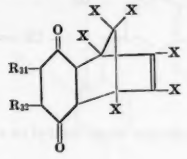
1. A process for the preparation of pure tertiary amine from a raw amine mixture obtained by reaction of a primary alcohol with ammonia in the presence of a hydrogenation/dehydrogenation catalyst, which comprises distilling off from said raw amine mixture a prerunning containing nonreacted alcohol and side products having a like number of carbon atoms, treating remaining distillation residue or a fraction thereof, which contains the bulk of the tertiary amine with hydrogen at a temperature of from 160° to 250°C in the presence of a hydrogenation/dehydrogenation catalyst, separating the catalyst from the treated residue, and distilling off the tertiary amine from the treated residue after separation of the catalyst.

3,875,236
1,4-METHANO-HEXAHALO-OCTAHYDRONAPHTHALENE-5,8-DIONE ALKYLTHIO ETHERS

Julian R. Little, Wayne; Walter Nudenberg, West Caldwell, and Yong S. Rim, Paterson, all of N.J., assignors to Uniroyal, Inc., New York, N.Y.

Division of Ser. No. 80,747, Oct. 14, 1970,. This application Feb. 2, 1973, Ser. No. 329,177
Int. Cl. C07c *49/44*
U.S. Cl. 260—586 G 2 Claims

1. A compound having the formula:



(VIII)

wherein R_{31} is hydrogen, R_{32} is —S—R_{33} wherein R_{33} is lower alkyl and X is halogen.

3,875,237
PREPARATION OF FLUORENONE

George E. Niznik, Elnora, N.Y., assignor to General Electric Co., Schenectady, N.Y.

Filed Mar. 21, 1974, Ser. No. 453,284
Int. Cl. C07c *49/76*
U.S. Cl. 260—590 3 Claims

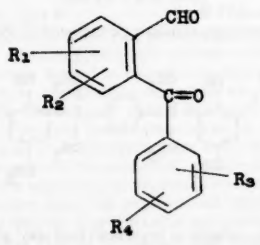
1. The process for preparing fluorenone which comprises reacting at a temperature ranging from ambient temperature to 100°C. a solution of fluorene in dimethyl sulfoxide with molecular oxygen in the presence of an alkali-metal hydroxide which is present in a positive amount up to 5.0 mol percent based on the molar concentration of the fluorene.

3,875,238
NOVEL 2-BENZOYL BENZALDEHYDE COMPOUNDS

Werner Metlesics, Clifton, and Leo Henryk Sternbach, Upper Montclair, both of N.J., assignors to Hoffman-La Roche, Nutley, N.J.

Division of Ser. No. 639,315, May 18, 1967, , which is a continuation-in-part of Ser. No. 626,965, March 30, 1967, abandoned. This application May 6, 1974, Ser. No. 467,176
Int. Cl. C07c *49/44*
U.S. Cl. 260—591 7 Claims

1. A compound of the formula:

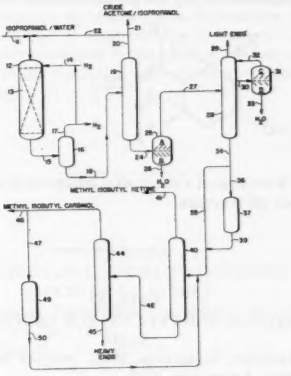


wherein R_1, R_2, R_3, and R_4 are each independently selected from the group consisting of hydrogen, halogen, lower alkyl, lower alkoxy, hydroxy, and trifluoromethyl.

3,875,239
DEHYDROGENATION OF ALCOHOLS TO KETONES

Bernhard Stouthamer, and Arien Kwantes, both of Amsterdam, Netherlands, assignors to Shell Oil Co., New York, N.Y.

Filed June 8, 1970, Ser. No. 44,051
Claims priority, application Netherlands, June 11, 1969, 6908875
Int. Cl. C07c *45/16*
U.S. Cl. 260—596 3 Claims



1. A process for producing ketones by conversion of acyclic aliphatic secondary monoalcohols having from 3 to 6 carbon atoms to a mixture of aliphatic ketones comprising ketones having the same number of carbon atoms as the secondary monoalcohols and ketones having twice as many carbon atoms as the secondary monoalcohols which comprises passing (1) a mixture of a said monoalcohol and water or (2) a mixture of a said monoalcohol, water, hydrogen and a lower alkanone over a catalyst consisting essentially of from 0.01% by weight to 1% by weight of platinum or rhodium on a non-acidic porous alumina support having an average pore diameter of between 150 and 250A, at a temperature of from 350°C to 500°C and a pressure of from 5 atmospheres to 10 atmospheres, and recovering from the resulting dehydrogenation product the aliphatic ketones having the same number of carbon atoms as the secondary monoalcohols and the aliphatic ketones having twice as many carbon atoms as the secondary monoalcohols.

3,875,240
SYNTHESIS OF ALDEHYDES

James D. McClure, Oakland, Calif., assignor to Shell Oil Company, New York, N.Y.

Continuation of Ser. No. 58.692, July 27, 1970, abandoned. This application Feb. 16, 1973, Ser. No. 333,433
Int. Cl. C07c *45/02*
U.S. Cl. 260—604 HF 5 Claims

1. The process for the production of aldehydes which comprises contacting an alkene having from 2 to 19 carbon atoms with hydrogen and from 0.50 to 0.05 mole, per mole of alkene, of carbon monoxide in an inert liquid phase reaction hydrocarbon or oxygenated hydrocarbon solvent of from 4 to 15 carbon atoms at a temperature of from about 150 to 275°C and a pressure of from 2000 to 3500 psig in the presence of a catalyst comprising metallic copper promoted with 0.2 to 4 moles of water per mole of copper, thereby reacting the alkene with carbon monoxide and hydrogen with the formation of aldehydes having one more carbon atom than the alkene.

3,875,241
BIS-ENOLETHERS OF SUBSTITUTED ACETYL CYCLOHEXANONES

Bernard Pierre Corbier, and Paul Jose Teisseire, both of Grasse, France, assignors to S. A. des Etablissements Rowre-Bertrand Fils & Justin Dupont, Grasse, France

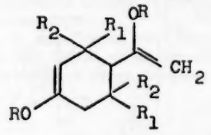
Continuation-in-part of Ser. No. 585,259, Oct. 10, 1966, Pat. No. 3,578,715. This application Jan. 28, 1971, Ser. No. 110,652

Claims priority, application Switzerland, Oct. 14, 1965, 14216/65

Int. Cl. C07C *43/18*

U.S. Cl. 260—611 R **4 Claims**

1. Compounds having the general formula



IV

wherein R represents a lower alkyl group and R_1 and R_2 represent lower alkyl groups.

3,875,242
COMPOUNDS AND PROCESS FOR PREPARING THE SAME

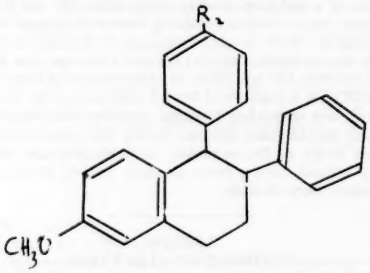
Daniel Lednicer, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 694,859, Jan. 2, 1968, abandoned, which is a continuation-in-part of Ser. No. 364,288, May 1, 1964, abandoned. This application Nov. 12, 1970, Ser. No. 89,063

Int. Cl. C07c *43/20*

U.S. Cl. 260—613 R **4 Claims**

1. A compound of the formula:



wherein R_2 is lower alkoxy substituted by a dihydroxyalkyl group having from 2 to 5 carbon atoms inclusive.

3,875,243
1-CYCLOPROPYL-TRANS-2-BUTEN-1-OL

Charles E. Descoins, and Clive A. Henrick, both of Palo Alto, Calif., assignors to Zoecon Corporation, Palo Alto, Calif.

Division of Ser. No. 218,512, Jan. 17, 1972, Pat. No. 3,825,607. This application June 22, 1973, Ser. No. 372,709

Int. Cl. C07c *35/00*

U.S. Cl. 260—617 R **1 Claim**

1. 1-Cyclopropyl-trans-2-buten-1-ol.

3,875,244
PHENANTHRENYL-BUTADIENOLS

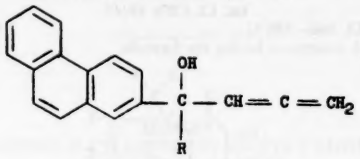
Paul L. Anderson, Dover, N.J., assignor to Sandoz-Wander, Inc., Hanover, N.J.

Filed Dec. 28, 1973, Ser. No. 429,403

Int. Cl. C07c *33/06*

U.S. Cl. 260—618 F **3 Claims**

1. A compound of the formula:



wherein R is a hydrogen atom, methyl or ethyl.

3,875,245
DIETHYNYLBENZYL ALCOHOLS AS HERBICIDES

Robert D. Dillard, Indianapolis, and Donald E. Pavey, Greenwood, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 109,704, Jan. 25, 1971, Pat. No. 3,794,480. This application Oct. 25, 1973, Ser. No. 409,555

Int. Cl. C07c *33/06*

U.S. Cl. 260—618 E **4 Claims**

1. A member of the group consisting of:
α,α-Diethynyl-2-chlorobenzyl alcohol
α,α-Diethynyl-2-bromobenzyl alcohol
α,α-Diethynyl-2-methylbenzyl alcohol
α,α-Diethynyl-3-methylbenzyl alcohol
α,α-Diethynyl-2,5-dimethylbenzyl alcohol and
α,α-Diethynyl-2-methyl-5-chlorobenzyl alcohol.

3,875,246
ALPHA, ALPHA-BIS-(2-HYDROXYPHENYL)-DIISOPROPYL BENZENES

Harald Oertel, Odenthal-Gloebusch; Ernst Roos, Cologne, and Kurt Ley, Odenthal-Gloebusch, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

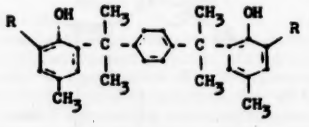
Division of Ser. No. 122,557, March 9, 1971, Pat. No. 3,778,409. This application June 13, 1973, Ser. No. 369,507

Claims priority, application Germany, Mar. 14, 1970, 2012285

Int. Cl. C07c *39/12*

U.S. Cl. 260—619 B **2 Claims**

1. A polyurethane stabilizing compound of the formula:



in which

R is either a straight or branched chain alkyl group containing 1 to 18 carbon atoms, a cycloalkyl group containing 5 to 6 carbon atoms which may be substituted by one or more lower alkyl groups, or an aralkyl group containing 7 to 9 carbon atoms.

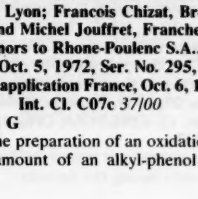
3,875,247

PROCESS FOR PREPARING ALKYLPHENOLS BY OXIDISING ALKYLBENZALDEHYDES

Francois Bourdin, Lyon; Francois Chizat, Bron; Michel Costantini, Lyon, and Michel Jouffret, Francheville Le Bas, all of France, assignors to Rhone-Poulenc S.A., Paris, France

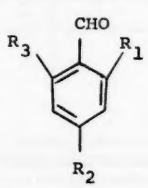
Filed Oct. 5, 1972, Ser. No. 295,165
Claims priority, application France, Oct. 6, 1971, 71.35969
Int. Cl. C07c 37/00
U.S. Cl. 260—621 G 10 Claims

1. Process for the preparation of an oxidation product containing a major amount of an alkyl-phenol of the general formula:



I

wherein each of R_1, R_2 and R_3 which may be the same or different, represents a hydrogen atom or a linear or branched alkyl radical containing 1 to 5 carbon atoms, with the proviso that the number of alkyl groups represented by symbols R_1, R_2 and R_3 is 1 or 2; or a formate ester of said alkyl phenol, which comprises oxidizing an alkylbenzaldehyde of the general formula:



II

wherein R_1, R_2 and R_3 are as defined above, with hydrogen peroxide in the presence of an acid with a dissociation constant in water greater than 10^{-3}, which is an inorganic acid or sulphonic acid, and converting any formate ester of the phenol of formula I formed into the phenol of formula I.

3,875,248

IMPROVED PROCESS FOR CRYSTALLIZING PENTAERYTHRITOL FROM AQUEOUS SOLUTIONS

Roy H. Prinz, Robstown, Tex., assignor to Celanese Corp., New York, N.Y.

Filed Oct. 22, 1970, Ser. No. 83,184
Int. Cl. C07c 29/24
U.S. Cl. 260—637 P 10 Claims

1. In a process for recovering pentaerythritol from an aqueous solution containing pentaerythritol and the formose sugars characteristically formed as by-products during the reaction of formaldehyde, acetaldehyde, and a base which is a member of the group consisting of sodium hydroxide and calcium hydroxide to produce pentaerythritol, which process comprises the steps of concentrating said solution, cooling the resulting concentrate to precipitate pentaerythritol crystals therefrom, and separating the product pentaerythritol crystals from the mother liquor, the improvement which comprises:

improving the rate of precipitation and quality of said pentaerythritol crystals by passing said aqueous solution, prior to said cooling step, through a bed of beads of an organic water-insoluble, non-ionic, hydrated, porous polymer which is characterized by macroreticular porosity, high surface area, and uniform pore-size distribution.

3,875,249

PREPARATION OF HALOALKYL AROMATIC HYDROCARBONS

Gunner E. Nelson, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 123,037, March 10, 1971, Pat. No. 3,787,512, which is a continuation-in-part of Ser. No. 813,340, April 3, 1969, abandoned, which is a continuation-in-part of Ser. No. 568,779, July 29, 1966, abandoned. This application Apr. 11, 1973, Ser. No. 349,927The portion of the term of this patent subsequent to Jan. 22, 1991, has been disclaimed.
Int. Cl. C07c 25/14
U.S. Cl. 260—651 HA 6 Claims

1. A process for producing ω-haloalkyl benzene or p-alkyl-ω-haloalkyl benzene by reacting α-ω-dihaloalkane with, respectively, benzene or alkyl benzene in the presence of a diluent and alkylaluminum halide catalyst whereby the addition of heat to the reaction is not necessary to effect a high reaction rate.

3,875,250

ISOMERIZATION OF 1,2-DICHLORO-3-BUTENE TO 1,4-ICHLORO-2-BUTENE

Ronnie D. Gordon, Richardson, Tex., assignor to Continental Oil Co., Ponca City, Okla.

Filed Dec. 26, 1972, Ser. No. 318,303
Int. Cl. C07c 21/04
U.S. Cl. 260—654 R 5 Claims

1. A method for converting 1,2-dichloro-3-butene to 1,4-dichloro-2-butene which comprises contacting said 1,2-dichloro-3-butene with a catalytic amount of an alumina catalyst having a surface area in the range of from about 10 to 500 square meters per gram at a temperature in the range of from about 25°C to about 200°C for an effective period of time to allow allylic rearrangement of said 1,2-dichloro-3-butene to said 1,4-dichloro-2-butene and recovering said 1,4-dichloro-2-butene.

3,875,251

2-(1-PROPENYL-5-NORBORNENE SEPARATION FROM PIPERYLENE DIMERS BY COMPLEXING WITH COPPER, SILVER, GOLD OR MERCURY COMPOUND

James Morgan Hunter Ellis; Paul Hepworth, and Pannalal Sohanlal Jhawar, all of Stockton-on-Tees, England, assignors to Imperial Chemical Industries Ltd., London, England

Filed Feb. 19, 1974, Ser. No. 443,769
Claims priority, application United Kingdom, Feb. 21, 1973, 8492/73
Int. Cl. C07c 13/28
U.S. Cl. 260—666 PY 8 Claims

1. In a process for the separation of 2-(1-propenyl)-5-norbornene from a mixture containing 2-(1-propenyl)-5-norbornene and piperylene dimers as hereinbefore defined the steps of

a. contacting the mixture with a compound of a metal selected from the group consisting of copper, silver, gold and mercury so as to form a complex between the 2-(1-propenyl)-5-norbornene and the metal compound.

b. separating said complex from the piperylene dimers and,

c. decomposing said complex to recover 2-(1-propenyl)-5-norbornene.

3,875,252
OXIDATIVE DEHYDROGENATION OF ORGANIC COMPOUNDS

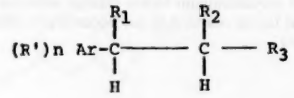
Werner O. Haag, and Joseph N. Miale, both of Trenton, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 10,023, Feb. 7, 1970, Pat. No. 3,787,517. This application Jan. 2, 1974, Ser. No. 429,994

Int. Cl. C07c *5/20, 15/10*

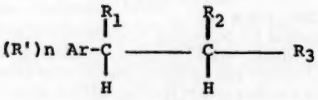
U.S. Cl. 260—669 R **10 Claims**

1. A process for the catalytic oxidative dehydrogenation of an alkyl aromatic hydrocarbon to produce compounds having a higher degree of unsaturation which comprises contacting said aromatic hydrocarbon and carbonyl sulfide with a catalyst consisting of a heavy metal deposited on an oxide carrier, said aromatic having the formula:



where Ar is an aryl or substituted aryl group; R_1, R_2, R_3 are selected from H or lower alkyl (C_1–C_4); R′ is selected from the group consisting of lower alkyl (C_1–C_4), alkoxy, halogen, cyano, aromatic and mixtures thereof, and where *n* is 0–5.

7. A process for the catalytic oxidative dehydrogenation of an alkyl aromatic hydrocarbon to produce compounds having a higher degree of unsaturation which comprises contacting said aromatic hydrocarbon and carbonyl sulfide with a catalyst consisting of silica, said aromatic having the formula:



where Ar is an aryl or substituted aryl group; R_1, R_2, R_3 are selected from H or lower alkyl (C_1–C_4); R′ is selected from the group consisting of lower alkyl (C_1–C_4), alkoxy, halogen, cyano, aromatic and mixtures thereof, and where *n* is 0–5.

3,875,253
DEHYDROGENATING NORMAL PARAFFINS

Shuan K. Huang, 7 Bavarian Ct., St. Louis, Mo. 63141

Filed Sept. 23, 1969, Ser. No. 860,419

Int. Cl. C07C *3/28*

U.S. Cl. 260—683.3 **4 Claims**

1. A method for producing mono-olefins from paraffins which comprises passing a mixture of a paraffin material and hydrogen at a temperature of from about 400°C to about 650°C into contact with a catalyst comprising a first metallic component selected from the group consisting of cobalt, zinc, oxides thereof and mixtures thereof and a second metallic component selected from the group consisting of noble metal oxides thereof and mixtures thereof, said first and second metallic components being deposited upon the surfaces of an alumina catalyst support material, said alumina support material having a surface area of at least 10 square meters per gram, an acidity factor not in excess of 2.0 and a macropore volume of at least 0.05 cc per gram, at an LHSV of from about 1 to about 100, said paraffin material consisting essentially of one or more paraffins having a chain length of from about 8 to about 24 carbon atoms.

3,875,254
BLOCK COPOLYMERS OF SILICONES WITH VINYL PYRIDINE

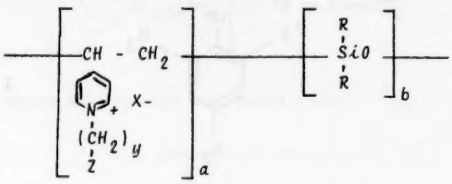
John W. Dean, Averill Park, N.Y., assignor to General Electric Company, New York, N.Y.

Continuation-in-part of Ser. No. 26,081, April 6, 1970, Pat. No. 3,673,272. This application Dec. 29, 1971, Ser. No. 213,821The portion of the term of this patent subsequent to June 27, 1989, has been disclaimed.

Int. Cl. C08f *33/08;* **C08g** *47/10*

U.S. Cl. 260—827 **8 Claims**

1. A block copolymer of quaternized vinyl pyridine and diorganosiloxy units having the formula:



where each R is independently selected from non-acidic, non-halogenated monovalent hydrocarbon radicals, X is a radical selected from the class consisting of chlorine, fluorine, iodine and bromine, Z is a radical selected from the radicals DCOO—, DO—, D_2N—, DHN—, D—, and DS— where D is a non-halogenated, non-acidic, monovalent hydrocarbon radical, *a* is greater than 25, *b* is greater than 10, *c* is at least 1, and *y* is from 1 to 13.

3,875,255
GRAFTING METHYL METHACRYLATE MONOMER INTO A EPOXY COPOLYMER BACKBONE

Yasuyuki Kato; Masahiko Moritani; Shuichi Konishi, and Yoshiharu Tatsukami, all of Niihama, Japan, assignors to Sumitomo Chemical Company Limited, Osaka, Japan

Filed Mar. 20, 1973, Ser. No. 343,154

Claims priority, application Japan, Mar. 21, 1972, 47-28737

Int. Cl. C08g *30/00*

U.S. Cl. 260—836 **8 Claims**

1. A process for producing an impact resistant methyl methacrylate resin, which comprises

polymerizing 40 to 99 percent by weight of (A) an unsaturated monomer mixture comprising (a) 50 to 100 percent by weight of methyl methacrylate and (b) 50 to 0 percent by weight of at least one unsaturated monomer copolymerizable with methyl methacrylate, the percentage by weight of these monomers being based on the total weight of the unsaturated monomers,

in the presence of 60 to 1 percent by weight of (B) an ethylene copolymer containing 5 to 99.95 percent by weight of ethylene, 0.05 to 95 percent by weight of one or more unsaturated epoxy monomers, and 0 to 50 percent by weight of at least one other unsaturated monomer copolymerizable with ethylene.

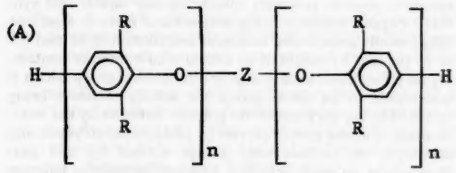
3,875,256
BIS(POLYPHENYLENE)-CARBONATE BLOCK COPOLYMERS

Dwain M. White, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 222,987, Feb. 2, 1972, Pat. No. 3,770,699, and a continuation-in-part of Ser. No. 222,988, Feb. 2, 1972, Pat. No. 3,770,850, each Division of Ser. No. 817. This application July 30, 1973, Ser. No. 383,998
Int. Cl. C08g *39/10*
U.S. Cl. 260—860 **20 Claims**

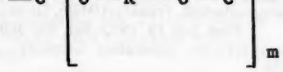
1. A block copolymer having the formula

(A)



where each R is independently selected from the group consisting of methyl and phenyl and n is the average number of repeating units and is in the range of 40 to 170, and Z is a divalent segmer having the formula

(B)



where R′ is C_{2-8} alkylene, phenylene, biphenylene, bis-(phenylene)-C_{1-8} alkane, bis(phenylene) oxide, poly(C_{2-8}-oxyalkylene) having an average number of repeating units of from 2 to 10 or the aforementioned groups containing a phenylene or biphenylene group wherein from 1 up to the total number of hydrogens on the aryl rings are replaced by C_{1-8} alkyl or halogen, and m represents the number of repeating units and is in the range of from 0 to 20.

3,875,257
BROMINATED BISPHENOL A DIETHANOL POLYFORMAL

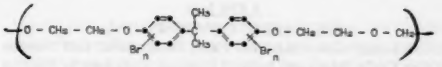
Harry R. Musser, and Winston J. Jackson, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 281,259, and a continuation-in-part of Ser. No. 365,773. This application Nov. 30, 1973, Ser. No. 420,494
Int. Cl. C08g *39/10*
U.S. Cl. 260—860 **16 Claims**

1. A moldable or fiber-forming composition consisting essentially of an admixture of

A. based on the weight of the composition, from 75 to 98 weight percent polyester, said polyester being the condensation product of at least one aliphatic or alicyclic diol containing 2 to 40 carbon atoms and at least one aliphatic, alicyclic or aromatic dicarboxylic acid or ester thereof having 3 to 40 carbon atoms and

B. based on the weight of the composition, from 25 to 2 weight percent of a polymer having an inherent viscosity in the range of 0.03 to 1.0 consisting essentially of recurring units of the structure



where *n* is 1 or 2, said inherent viscosity being determined at 25°C in 60/40 phenol/tetra chloro ethane at a concentration of 0.50 g./100 ml.

3,875,258
GRAFT COPOLYMERS

John T. Patton, Jr., Wyandotte; Louis C. Pizzini, Trenton; William W. Levis, Jr., Wyandotte, and Bernard A. Merkl, Detroit, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Oct. 15, 1973, Ser. No. 406,534
Int. Cl. C08f *21/00*
U.S. Cl. 260—869 **8 Claims**

1. A fire retardant graft copolymer prepared by the in situ polymerization in the presence of a free radical catalyst at a temperature of from 70°C. to about 170°C. of

a. an ethylenically unsaturated monomer or mixture of monomers, at least one of which contains phosphorus or phosphorus and halogen, and

b. an unsaturated polyol having an acid number of about one or less and containing from about 1.0 mole to about 2.5 moles of ethylenic unsaturation per mole of polyol, said polymerization carried out by simultaneously adding at a steady rate the monomer and the catalyst to the polyol.

3,875,259
THERMOPLASTIC RESIN-GRAFT POLYBLEND COMPOSITIONS

Shuji Yoshida, Chiba, and Tateo Iguchi, Ichihara, both of Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 334,702. This application Mar. 12, 1974, Ser. No. 450,298
Claims priority, application Japan, Feb. 26, 1972, 47-20045
Int. Cl. C08f *41/12, 29/56*
U.S. Cl. 260—876 R **6 Claims**

1. Thermoplastic resin compositions prepared by the steps of copolymerizing 0.5 to 25 parts by weight of at least one compound selected from the group consisting of acrylic and methacrylic esters of ethylene glycol monomethyl ether with 99.5 to 75 parts by weight of monomers consisting of alkyl acrylate wherein the alkyl group has 2 to 8 carbon atoms to obtain a rubbery copolymer A; graftpolymerizing 100 parts by weight of said rubbery copolymer A with 100 to 300 parts by weight of at least one compound selected from the group consisting of aromatic vinyl compounds, vinyl cyanides and mixtures of either of said both types of compounds and monomers copolymerizable therewith in the presence of 0 to 0.5 parts by weight of a chain transfer reagent to obtain a graftpolymer B; and blending said graftpolymer B with a polymer C separately prepared from at least one compound consisting of aromatic vinyl compounds, vinyl cyanides and mixtures thereof so as to cause said graftpolymer B to be uniformly dispersed in particle sizes of 150 to 1000 millimicrons in said polymer C.

3,875,260
POLYMERIC COMPOSITIONS

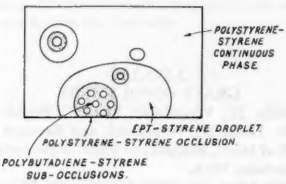
Pravinkumar Goverdhanbhai Patel, Dunkinfield, and Thomas Orr Craig, Mottram, both of England, assignors to Sterling Moulding Materials, Stabybridge, Cheshire, England

Filed Dec. 7, 1971, Ser. No. 205,695

Claims priority, application United Kingdom, Dec. 17, 1970, 60078/70

Int. Cl. C08f *15/00*

U.S. Cl. 260—878 R **7 Claims**



1. A process for the production of a polymer composition comprising a matrix of polystyrene having disposed therein particles of an ethylene-propylene terpolymer (EPT) having a Mooney Viscosity of from 20 to 200, said dispersed particles containing occlusions of matrix material, said occlusions containing subocclusions of a modified polybutadiene having a Mooney Viscosity (ML 1 + 4 at 100°C) of from 25 to 70, which process comprises providing a solution of EPT having a Mooney Viscosity of from 20 to 200 and polybutadiene having a Mooney Viscosity (ML 1 + 4 at 100°C) of from 25 to 70 in monomeric styrene, the concentrations of EPT and polybutadiene being from 5 to 7 percent and from 0.5 to 2 percent by weight, respectively, based on the weight of the total composition and the volume of the polybutadiene-styrene phase being less than that of the EPT-styrene phase and effecting polymerization by an agitated mass polymerization technique until at least 20 percent of the styrene has polymerized and thereafter completing the polymerization either in mass or in a suspension in water.

3,875,261
METHOD FOR PRODUCING THIN-WALLED ARTICLES FROM PLASTICS

Viktor Heidingsfeld; Slavko Hudecek; Jaroslav Hnidek; Jan Kolarik, and Jiri Zelinger, all of Praha, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Praha, Czechoslovakia

Filed Nov. 1, 1972, Ser. No. 302,898

Claims priority, application Czechoslovakia, Nov. 5, 1971, 7797-71

Int. Cl. C08f *29/22, 37/18*

U.S. Cl. 260—899 **8 Claims**

1. Method for making a thin-walled plastic article comprising admixing at least one hydrophilic filler based on a synthetic cross-linked water-insoluble macromolecular compound containint polar groups capable of binding water reversibly, at least one liquid boiling in the range of from 60°C to 140°C and effective to swell said hydrophilic filler selected from the group of water and lower aliphatic alcohols, and a vinyl chloride plastisol type resin material selected from the group of polyvinylchloride, copolymers of vinyl chloride and mixtures thereof, wherein said liquid is used in an amount of at least 10 percent by weight referred to the hydrophilic filler, to form a uniform blend thereof and thereafter forming a thin walled article with said blend.

3,875,262
STABILIZED ORGANOSOLS THROUGH THE INTER-REACTION OF FUNCTIONAL GROUPS ON THE STABILIZER AND DISPERSED POLYMERS

David G. Milne, Bryn Mawr, Pa., assignor to E. I. du Pont de Nemours and Co., Wilmington, Del.

Continuation of Ser. No. 28,221, is a continuation of Ser. No. 683,440, Nov. 16, 1967, abandoned. This application Nov. 13, 1972, Ser. No. 305,882

Int. Cl. C08f *29/22*

U.S. Cl. 260—900 **8 Claims**

1. Composition comprising organic liquid containing preformed perfluoroolefin polymer particles having attached therto 1–100 percent by weight thereof of other preformed synthetic organic polymers soluble in said liquid, said synthetic organic polymer being polymerized from at least one ethylenically unsaturated monomer and containing at least 0.5 to 25 percent by weight of an unsaturated monomer containing an amine functional group or a functional group which is convertible to an amine group the soluble-polymers being attached to the perfluoroolefin polymer particles by the interreaction of amine groups carried by said soluble polymers and carboxylic or sulfonic acid groups carried by said perfluoroolefin polymer particles, said perfluoroolefin polymer containing at least one carboxylic or sulfonic acid group per molecule.

3,875,263
DIPHOSPHINIC ACID ESTERS AND PROCESS FOR MAKING SAME

Walter Herwig, Neuenhain, Taunus, and Hans-Jerg Kleiner, Bad Soden, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt/Main, Germany

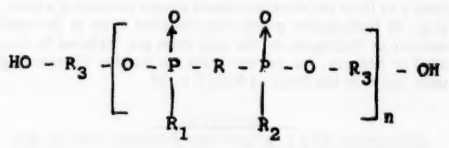
Filed July 19, 1973, Ser. No. 380,743

Claims priority, application Germany, July 22, 1972, 2236036

Int. Cl. C07f *9/46*

U.S. Cl. 260—928 **7 Claims**

1. A pure phoshpinic acid ester of the formula



wherein R represents a saturated, open-chain, optionally branched or cyclic alkylene having from 1 to 15 carbon atoms, phenylene, biphenylene or phenylalkylene having up to 6 carbon atoms in the alkylene radical, R_1 and R_2 represent alkyl or cycloalkyl groups having up to 6 carbon atoms, phenyl or benzyl, R_3 represents a saturated, open-chain, optionally branched or cyclic alkylene having from 2 to 15 carbon atoms and n is from 1 to 30.

3,875,264
PHOSPHONOUS ACID ESTERS

Kurt Hofer, Munchenstein/BL, and Guenther Tscheulin, Riehen/BS, both of Switzerland, assignors to Sandoz Ltd. (also known as Sandoz, AG), Basel, Switzerland

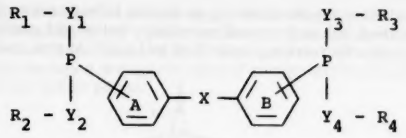
Filed Nov. 21, 1972, Ser. No. 308,594

Claims priority, application Switzerland, Nov. 24, 1971, 17129/71

Int. Cl. C07f *9/08, 9/16*

U.S. Cl. 260—932 **19 Claims**

1. A compound of the formula



in which

X signifies $-CH_2-$, $-O-$, or $-S-$,

Y_1, Y_2, Y_3 and Y_4, which may be the same or different, each signifies $-O-$ or $-S-$,

R_1, R_2, R_3 and R_4, which may be the same or different, each signifies a hydrocarbon radical of up to 20 carbon atoms selected from the group consisting of alkyl; cycloalkyl which may be substituted by up to 3 alkyl groups; cycloalkylalkyl; phenyl which may be substituted by up to 3 alkyl or alkylcycloalkyl groups; diphenyl which may be substituted by up to 3 alkyl or alkylcycloalkyl groups; and phenyl and diphenylalkyl, the aryl portions of which may be substituted by up to 3 alkyl groups,

and rings A and B may be either unsubstituted or each further substituted by 1 or 2 alkyl groups of 1 to 6 carbon atoms

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3,875,265

O-BENZYL-O-ETHYL-O-2,4,5-TRICHLOROPHENYL PHOSPHOROTHIOATE

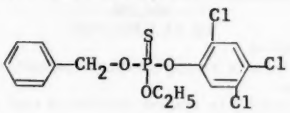
Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, New York, N.Y.

Division of Ser. No. 123,410, March 11, 1971, Pat. No. 3,780,143. This application Apr. 23, 1973, Ser. No. 353,869

Int. Cl. C07f *9/08;* **A01n** *9/36*

U.S. Cl. 260—964 **1 Claim**

1. A compound of the following formula:



3,875,266

CARBURETOR FOR AN INTERNAL COMBUSTION ENGINE

Dezso Fonagy, 2-2 bis, Route de la Liberation, Chennevieres S/Marne, France

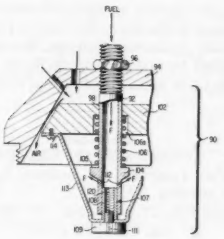
Filed June 15, 1973, Ser. No. 370,416

Claims priority, application Switzerland, Jan. 26, 1973, 1143/73

Int. Cl. F02m *9/12*

U.S. Cl. 261—50 A **9 Claims**

1. A carburetor for an internal combustion engine comprising a lower portion having an opening adapted to be connected to a suction inlet of the engine, a partially closed compartment defining an air passage therethrough extending upwardly from said opening and being provided with a cover, valve means for regulating the air passage through said opening thereby controlling the transmission into said compartment of the reduced pressure produced by the suction effect of the engine, piping means including an arrangement of fuel lines adapted to be connected to a fuel supply and provided with fuel distribution means for providing an air-fuel mixture necessary for each running speed of the engine, said fuel distribution means comprising a system of outlets connected to means for conditioning the fuel flow, said conditioning means including a device sensitive to at least one of the two joint parameters which are the reduced pressure and the kinetic energy of the air current, said sensitive device comprises fuel outflow regulating means which cooperates with an outlet to control the distribution of a fuel flow adapted to each of the running speeds of the engine, said compartment being formed in a tubular body which has the general form of a funnel, said valve means comprising a butterfly-valve being mounted in the tubular part having the smallest transversal dimension of this body and the said compartment being formed in the truncated part of the funnel form, the main jet fuel outlet, regulatable and susceptible of being completely closed, comprising calibrated openings provided in the lower part of the wall of a conduit having the form of a tube element secured to said cover at the center of the height of the funnel form, directed towards the bottom coaxially to this form, whereby said tube element forms at least a part of said arrangement of fuel lines and said sensitive device comprising a movable choke plate crossed through at its center by said tube element and displacing itself coaxially to said tube element



and to the funnel form to control an air inflow through an opening made in the cover of said compartment, the movement of said choke plate being controlled against the action of elastic retraction means by the suction in the said compartment, said main fuel outlets being controllably opened or closed relative to the amount of said air inflow, said fuel outflow regulating means of said sensitive device being fixedly connected to said movable choke plate by an open cradle means under said choke plate and includes a piston slidingly positioned at the lower end of the fuel outlet conduit for controlling the fuel discharged through said calibrated openings in said fuel conduit, said choke plate being constructed and positioned relative to said main outlets and said fuel outflow regulating means for causing fuel to be ejected directly below said choke plate in the part of said compartment where reduced pressure from the engine is primarily introduced, whereby the fuel impacts the incoming air under optimum conditions for intimate mixing with each other.

3,875,267

CARBURETOR FLOAT

Chichitada Seki, and Takashi Hisatomi, both of Yokohoma, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Dec. 12, 1973, Ser. No. 424,082

Claims priority, application Japan, Dec. 20, 1972, 47-127098

Int. Cl. F02m *5/02*

U.S. Cl. 261—70 **5 Claims**

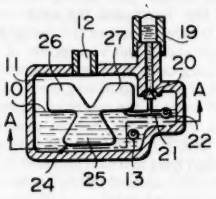
1. In combination; means defining a liquid float chamber, a float swingable in a normally vertical plane within said liquid float chamber, a normally horizontal pin about which said float is swingable;

a lever connecting said float to said pin; means defining a liquid inlet to said chamber; valve means connected to said lever to open and close said liquid inlet to the chamber;

said float having one lower section and two upper sections spaced along the axis of the lever;

said lower section being substantially below and said two upper sections being substantially above a predetermined normal level of liquid in the float chamber;

the effective surface area of said float in contact with liquid in the float chamber thus increasing as at least one of the



float chamber and the surface of liquid in the float chamber is rotated in the normally vertical plane from respective normally horizontal positions, thereby increasing the force applied by said float to the lever in a direction to cause said valve means to close the fuel inlet.

3,875,268

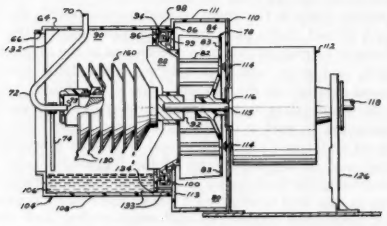
CONDENSER APPARATUS

Laddie A. DePass, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Feb. 27, 1974, Ser. No. 446,220

Int. Cl. B01d *47/16*

U.S. Cl. 261—88 **12 Claims**



1. An improved liquid droplet forming device comprising:

a. a rotatable liquid reservoir,

b. a plurality of discs axially stacked and spaced from each other mounted on a rotatable shaft, and

c. a plurality of channels with at least one channel in liquid flow communication between the reservoir and each disc, said channels having their one end terminated at the reservoir in alignment as viewed in a plane perpendicular to the shaft's axis of rotation and the portions of the channels in the reservoir all substantially the same width and equally spaced.

3,875,269

COOLING TOWER DISTRIBUTION BOX

James F. Forchini, Healdsburg, and Mark A. Machado, Santa Rosa, both of Calif., assignors to Ecodyne Corporation, Lincolnshire, Ill.

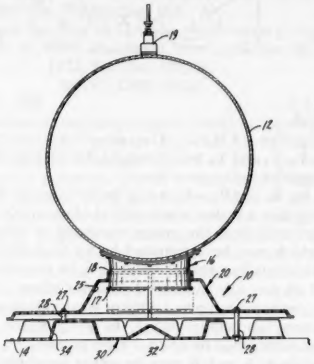
Filed Jan. 18, 1973, Ser. No. 323,487

Int. Cl. B01f *3/04*

U.S. Cl. 261—111 **15 Claims**

1. A distribution box for receiving water to be cooled from a substantially horizontal cooling tower manifold pipe and uniformly distributing the water over a substantially horizontal hot water basin floor having spray nozzles positioned therethrough, comprising:

a. a covering shroud having an opening in fluid communication with and secured immediately below said manifold pipe for receiving water from said manifold pipe; and



b. a distribution pan positioned immediately below and covered by said covering shroud having a plurality of flow directing means formed integral therewith for receiving the water directed thereon from said covering shroud and uniformly distributing it in a substantially horizontal direction over said water basin floor.

3,875,270

PROCESS OF PREPARING BATTERY SEPARATORS

Albert J. Haefner; Joseph B. Glass, and William E. Burt, all of Baton Rouge, La., assignors to Ethyl Corp., Richmond, Va.

Continuation-in-part of Ser. No. 373,178, June 25, 1973, abandoned, which is a continuation of Ser. No. 856,840, Sept. 10, 1969, abandoned. This application July 1, 1974, Ser. No. 484,398

Int. Cl. B29d *27/00*

U.S. Cl. 264—6 **9 Claims**

1. A process for making a battery separator, said process comprising:

a. polymerizing an aqueous emulsion of vinyl chloride to produce an aqueous resin emulsion,

i. said resin emulsion containing latex particles ranging in diameter from about 0.01 to 2.0 microns, and

ii. solids in an amount equal to about 10 to 60 percent, based on the total weight of solids in the emulsion;

b. mixing a diatomaceous earth filler comprising particles ranging in size from about 150 to about 2 microns with said resin emulsion prior to spray drying said resin emulsion wherein said filler comprises from about 10 to about 40 percent by weight of the total weight of solids in said resin emulsion including said filler.

c. spray drying said mixture of resin emulsion and filler; and

d. shaping said mixture of resin emulsion and filler into a sheet profile and sintering said profile to produce a rigid sheet having a volume porosity of from about 30 to about 70 percent and a pore size of from about 20 to about 40 microns.

3,875,271

HOLLOW PELLETS AND METHOD FOR MAKING SAME

Robert M. Martin, Golden, Colo., assignor to Coors Porcelain Company, Golden, Colo.

Filed July 30, 1973, Ser. No. 383,628

Int. Cl. B29h *7/20*

U.S. Cl. 264—43 **32 Claims**

1. A method for making hollow pellets comprising: surrounding at least most of the surface of drops of a liquid with powder which includes the material of which it is desired to make the pellets and which is insoluble in the liquid thereby

to form a shell of the powder around each of the drops, at least one of said liquid and powder including a binder for the material which binder is soluble in the liquid; and thereafter evaporating the liquid through the shell of powder thereby to provide the hollow pellets.

3,875,272

HOLLOW PELLETS AND METHOD OF MAKING SAME

Robert M. Martin, Golden, Colo., assignor to Coors Porcelain Company, Golden, Colo.

Continuation-in-part of Ser. No. 383,628, July 30, 1973,. This application Nov. 26, 1973, Ser. No. 419,018

Int. Cl. B29h *7/20*

U.S. Cl. 264—43 **15 Claims**

1. A method for making a high strength hollow pellet comprising forming a hollow pellet the shell of which comprises particulate material by depositing the particulate material onto the surface of a drop of liquid subsequent to which the liquid is evaporated through the shell, and providing the shell with at least an outer portion having a density greater than that of the shell as initially formed by a step comprising either (a) compacting said shell by the application of compacting forces thereto, (b) applying to said shell a layer comprising particulate material of smaller size than that of the particulate material of which the shell is initially formed, or (c) a combination of (a) and (b).

3,875,273

HOLLOW PELLETS AND METHOD OF MAKING SAME

Robert M. Martin, Golden, Colo., assignor to Coors Porcelain Company, Golden, Colo.

Continuation-in-part of Ser. No. 383,628, July 30, 1973,. This application Nov. 26, 1973, Ser. No. 419,019

Int. Cl. B29h *7/20*

U.S. Cl. 264—43 **24 Claims**

1. A method for making hollow pellets having interior surface portions of a material which is different than the material of the exterior surface portions, said method comprising: surrounding at least most of the surface of drops of a liquid with powder which includes the material from which it is desired to make the exterior surface portions of the pellets and which is insoluble in the liquid thereby to form a shell of the powder around each of the drops, said liquid containing material from which it is desired to make the interior surface portions of the pellets, at least one of said liquid and powder including a binder for the powder material which binder is soluble in the liquid; and thereafter evaporating the liquid through the shell of powder thereby to provide the hollow pellets.

3,875,274

Patent Not Issued For This Number

3,875,275

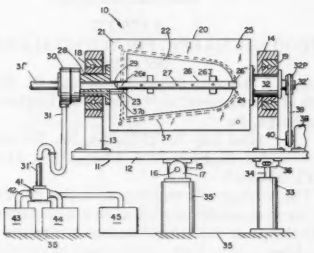
METHOD FOR MOLDING COMPOSITE BODIES

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Continuation of Ser. No. 744,048, July 1, 1968, abandoned, which is a continuation-in-part of Ser. No. 439,548, March 15, 1965, Pat. No. 3,366,993, which is a continuation-in-part of Ser. No. 734,340, May 9, 1958, Pat. No. 3,173,175, which is a continuation-in-part of Ser. Nos. 703,287, Feb. 6, 1968, Pat. No. 3,412,431, and Ser. No. 84,186, Oct. 26, 1970, , which is a continuation-in-part of Ser. No. 281,306, May 17, 1963, Pat. No. 3,364,292, which is a continuation-in-part of Ser. No. 732,937, May 5, 1968, abandoned. This application Oct. 24, 1972, Ser. No. 300,248

Int. Cl. B29d *27/04*

U.S. Cl. 264—45.3 **17 Claims**



1. A method of forming hollow objects comprising:

disposing a tubular member across the cavity of a multiple-part mold,

disposing a first molding material as a layer against the wall of said mold cavity and solidifying said first molding material thereagainst to form a hollow shell-like formation totally surrounding the unoccupied spatial volume interior thereof and against portions of said tubular member,

flowing a second molding material through said tubular member into the volume within said hollow formation, and

causing said second molding material to solidify in situ against the inside surface of the hollow formation formed against the wall of the mold cavity so as to provide a composite article of said first and second molding materials and to secure said tubular member within said hollow body by solidification in situ against said tubular member.

3,875,276

METHOD FOR CONTINUOUSLY PRODUCING A SYNTHETIC POLYMER FOAMED MASS HAVING SQUARE CROSS SECTION

Hisashi Haga, Kobe, and Yukio Takamatsu, Akashi, both of Japan, assignors to Toyo Rubber Industry Company Ltd., Osaka, Japan

Division of Ser. No. 240,405, April 3, 1972, Pat. No. 3,768,937. This application June 28, 1973, Ser. No. 374,430

Int. Cl. B23d *27/00*

U.S. Cl. 264—51 **2 Claims**

1. A method of continuously producing a synthetic polymer foamed mass having square cross sections which comprises

supplying a foaming liquid material continuously in a channel-shaped, continuously extending trough, as a mold, mounted on a conveyor belt and travelling with said conveyor belt, said trough having side walls lower than the height of a finally foamed mass, and simultaneously moving tubular elongated films of a synthetic polymer or resin surrounding guiding plates adjacent each of said sidewalls, said guiding plates being reversely bent about an oblique transverse line to provide a twisted and folded shape and being nearly flush with or higher than the height of a finally foamed mass and having in the middle thereof as oblique upper rim portion of an obliqueness equal to or slightly greater than the angle of the rising foaming material in the region where foaming of said material begins to occur and is finished, whereby the foaming material is conveyed in conformity with the movement of said films with the lateral ends of the rising foaming material adjacent said films in the area of foaming being moved upwardly with the advancement of said films.

3,875,277

METHOD FOR MAKING POLYCRYSTALLINE ALUMINA ARC TUBES

Raymond J. Bratton, Delmont, and Shih M. Ho, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 30, 1973, Ser. No. 383,622
Int. Cl. F27d *7/06*; **C04b** *35/64*, *35/10*
U.S. Cl. 264—65 **3 Claims**

1. The method of preparing a tubular polycrystalline alumina member suitable for use as an arc-containing tube for an arc-discharge device, which method comprises:

a. adding to very finely divided high purity alumina powder from about 0.15 to 0.7% by weight of said alumina of magnesium aluminate spinel consisting of irregular shaped particles of average diameter less than about 100 nm, and thoroughly mixing said spinel and said alumina to achieve a uniform distribution of said spinel throughout said alumina;

b. filling said mixture as a dried powder into an isostatic pressing mold having tubular-shaped mold cavity dimensions a predetermined amount larger than the desired final dimensions for said completed arc tube to compensate for shrinkage encountered during pressing and sintering thereof;

c. isostatically pressing the mold-contained powder at a pressure of at least 15,000 psi to produce a green tube;

d. presintering the pressed green tube at a temperature of at least 800°C for at least 1 hour to provide the pressed green tube with additional strength to facilitate handling; and

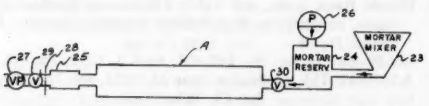
e. final sintering the tube at a temperature of from 1700°C to 1950°C in oxygen, hydrogen or vacuum for a sufficient period of time to obtain a grain size in said sintered tube of at least 10 microns as measured by the average planar intercept method.

3,875,278

MASONRY WALL CONSTRUCTING PROCESS

Harry J. Brandt, Granite City, Ill., assignor to Brandt Automasonry Corporation, Granite City, Ill.

Filed Oct. 30, 1972, Ser. No. 302,352
Int. Cl. B23b *1/24*
U.S. Cl. 264—90 **4 Claims**



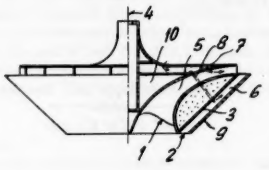
1. In the process of prefabricating a masonry wall member from a plurality of construction blocks including bricks or the like through the use of a form container and a vacuum pump, including arranging a series of such blocks in the form container and into the configuration of a wall member desired, rigidly enclosing the arranged blocks within the container to allow for their hermetic sealing therein, reducing the pressure in the closed container down to an approximate vacuum, discontinuing any further pressure reduction by ceasing the vacuuming of the sealed container by the operation of the vacuum pump while maintaining the developed vacuum within the sealed container, providing a source of flowable cementitious for the interior of the container, then drawing the flowable cementitious material into the container through the influence of the developed vacuum to fill all the interstices uniformly and completely between the arranged blocks, and thereafter discontinuing the drawing of material into the container and allowing the wall to set and commence cure.

3,875,279

SURFACE VENTILATION ROTOR

Joseph Richard Kaelin, Villa Seeburg, 6374 Bouchs, Switzerland

Filed Nov. 21, 1972, Ser. No. 308,599
Claims priority, application Switzerland, Nov. 22, 1971, 17042/71
Int. Cl. B01f *3/04*
U.S. Cl. 261—91 **9 Claims**



1. A surface aeration rotor for adding oxygen or an oxygen mixture into waste water which is to be clarified comprising:

means defining at least two annular blade sets each including a plurality of blades defining fluid channels therebetween;

said sets being concentric with respect to each other and housed radially adjacent each other, a dividing wall being disposed between said blade sets;

the innermost channels being curved within vertical planes in such a manner that said waste water entering said innermost channels from a position therebelow is deflected within said innermost channels through an angular displacement of approximately 90° so as to leave said innermost channels and emerge from the periphery of said rotor within paths extending in an approximately horizontal direction; and

the outermost channels being inclined vertically upwardly and radially outwardly within vertical planes in such a manner that said waste water entering said outermost channels from a position therebelow is conducted within said outermost channels so as to leave said outermost channels and emerge from said periphery of said rotor within paths which intersect said horizontal exit paths of said innermost channels,

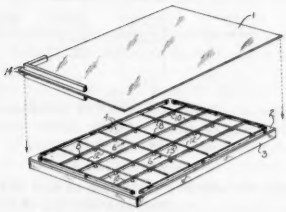
whereby intensive mixing of said waste water exiting from said fluid channels occurs immediately subsequent to said emergence of said water from said fluid channels.

3,875,280

METHOD FOR MAKING AN INTEGRATED REINFORCED PLASTIC UNIT

William K. Story, Wilton Manors, Fla., assignor to Plasteel Industries Incorporated, Fort Lauderdale, Fla.

Division of Ser. No. 120,086, March 2, 1971, Pat. No. 3,710,733, which is a continuation-in-part of Ser. Nos. 66,748, Aug. 25, 1970, abandoned, and Ser. No. 66,749, Aug. 25, 1970,. This application Oct. 17, 1972, Ser. No. 298,253
Int. Cl. B29c *17/04;* B29d *3/02*
U.S. Cl. 264—92 2 Claims



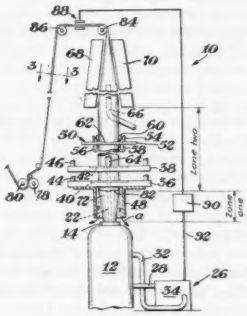
1. The method of thermoforming an integrated plastic unit which comprises providing a mold with spacers having notches at the upper end throughout the face of the mold with the spacers extending in a generally straight line in one direction on the mold and in a generally straight line in a second direction on the mold and with the spacers tapering from the face of the mold to the free upper end of the spacers and the notches in the spacers being a short distance above the surface of the mold and fillet members disposed between the spacers with said members tapered correspondingly to the taper of the spacers, placing a first set of metal reinforcing members in the notches of the first named spacers and a second set of reinforcing members in the notches of the second named spacers and across the first named reinforcing members with said reinforcing members crisscrossing at the location of the spacers and fillet members, heating a single sheet of polyethylene thermoplastic material to a temperature whereby the sheet after heating is in a pliable condition so that it will readily flow when pressure is applied to it, then placing the single sheet of the preheated polyethylene thermoplastic material over the reinforcing members, the sheet being of a slightly greater size than the mold, sealing the ends of the sheet to the mold, thereafter drawing a vacuum through holes in the mold to force the plastic sheet toward the mold, continuing to apply the vacuum to thereby effect flow of the thermoplastic material around and underneath the reinforcing forming members to thereby encapsulate said forming members and melding the thermoplastic material into a single solid rib extending under and from each reinforcing member uninterrupted by any hairline crevices, further continuing to apply the vacuum to flow the thermoplastic material over the mold to form a flat surface extending in a direction at generally right angles to said ribs while simultaneously damming the flow of said material by said spacers and fillet members to prevent thinning and consequent tearing of the plastic sheet at the cross over areas of the metal reinforcing members, and then cooling said integrated plastic unit.

3,875,281

MANUFACTURE OF FILM INCLUDING INTEGRAL ZIPPER-LIKE FASTENERS

Raymond D. Behr, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 99,782, Dec. 21, 1970, abandoned. This application Dec. 26, 1972, Ser. No. 318,108The portion of the term of this patent subsequent to Dec. 26, 1972, has been disclaimed.
Int. Cl. B29c *17/02*
U.S. Cl. 264—95 2 Claims



1. In a method of manufacturing film; the steps comprising: extruding a tube of a heat plastified, film forming synthetic resinous material, simultaneously extruding a first thickened profile of a general type defining a continuous gap the width of which is sensitive to hoop tension in the tube during its manfacture, and at least a second thickened profile spaced circumferentially from the gap defining profile and adapted to be interlockingly receivable in said gap by means of cooperative sizing and configuration between the profiles, said profiles extending continuously in the direction of extrusion along the inner surface of the tube, cooling and forming the tube about a trapped gas bubble and thereafter collapsing the tube, the improvement of which comprises, the step of reducing the inherent hoop tension imparted to the gap defining profile by the trapped gas bubble, said step of reducing hoop tension being practiced selectively over a sufficient portion of the region defined between the frost line of the film and that of the profiles as is necessary to properly size said gap respective to the size of the profile receivable therein, to thereby produce from said profiles a mechanically locking and unlocking fastener.

3,875,282

PRODUCTION OF HIGH BULK DENSITY SPRAY DRIED HYDROUS SODIUM SILICATE

Joseph S. Steinreich, Olympia Fields, Ill., assignor to Stauffer Chemical Co., Westport, Colo.

Filed Apr. 30, 1973, Ser. No. 355,856
Int. Cl. B01j *2/22*
U.S. Cl. 264—118 7 Claims

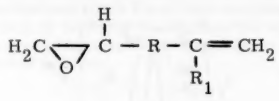
1. A method of increasing the bulk density and particle size of spray dried particles of hydrous sodium silicate consisting essentially of small hollow spheres having a glassy outer surface, comprising: applying mechanical pressure to said spherical particles having a water content of about 13–25% by weight and a SiO_2:Na_2O weight ratio of about 0.8:1 to 4.0:1 to form said spherical particles into compacted articles of larger size and having an increased bulk density.

3,875,283
SPINNING EPOXIDE CONTAINING ACRYLICS INTO BATHS CONTAINING POLYHYDROXYLS

Gary Wentworth, Raleigh, N.C., assignor to Monsanto Company, St. Louis, Mo.

Filed Apr. 5, 1971, Ser. No. 131,468
Int. Cl. D01f *7/00*
U.S. Cl. 264—182 **6 Claims**

1. A method of preparing acrylic filaments comprising: polymerizing monomers to form a polymer comprising at least 85% by weight acrylonitrile and from about 4% to about 15% by weight of an epoxide-containing vinyl monomer represented by the general formula:



wherein R is a divalent radical of from 1 to about 5 carbon atoms, $-CH_2-O-$, $-CH_2OCO-$ or $-CH_2-O-CH_2-$, and R_1 is hydrogen or methyl, in the presence of a free radical-producing initiator the epoxide portion of the epoxide-containing vinyl monomer being pendant to the polymer chain,

isolating the polymer,

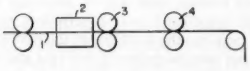
dissolving the polymer in a solvent to form a dope, and

extruding the dope to form filaments in a bath containing a polyhydroxyl compound and an activating amount of a catalyst to effect a chemical bond between said epoxide portion and the polyhdyroxyl compound.

3,875,284
PROCESS FOR PREPARING CLEAR POLYOXYMETHYLENE FILM

Kiichiro Sasaguri; Takeo Yuasa, and Kazuhiko Shimura, all of Tokyo, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Sept. 25, 1972, Ser. No. 291,571
Int. Cl. B29d *7/24*
U.S. Cl. 264—288 **8 Claims**



1. The process for preparing clear polyoxymethylene film including the step of passing said film through heated pressing rollers maintained at a temperature within the range from that at which the polyoxymethylene crystals begin to melt to that at which said crystals finish melting which comprises:

a. preheating the film at a temperatuare not lower than 20°C. below the temperature of said pressing rollers and not higher than the temperature of said pressing rollers;

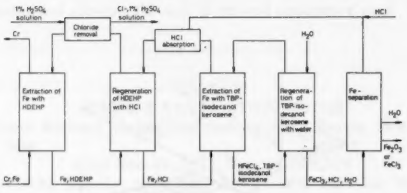
b. rolling the preheated film to a thickness not greater than 95 percent of the original thickness through said heated pressing rollers while maintaining the temperature of the film within said range; and

c. simultaneously stretching the film thus rolled to such an extent that the thickness of the stretched film is reduced to from 1/1.2 to 1/6 of the original thickness.

3,875,285
PROCESS FOR SELECTIVE EXTRACTION OF FERRIC IRON FROM TRIVALENT CHROMIUM BY ALKYL-PHOSPHOROUS COMPOUNDS

Bror Goran Nyman, Turku, and Stig-Erik Hultholm, Pori, both of Finland, assignors to Outokumpu Oy, Helsinki, Finland

Filed Aug. 30, 1973, Ser. No. 392,963
Claims priority, application Finland, Sept. 4, 1972, 2439/72
Int. Cl. C01g *49/00*
U.S. Cl. 423—54 **7 Claims**



1. A process for selective extraction of iron (III) from an acid aqueous solution containing iron (III) and chromium (III) which comprises extracting iron (III) from an aqueous sulphate solution containing more than 50 g/l H_2SO_4 at an elevated temperature with a hydrocarbon solution of a substantially water immiscible organic extractant, said extractant being an acid alkyl-substituted phosphoric compound.

3,875,286
BENEFICIATION OF ILMENITE ORES

Michael Robinson; Frank Clamp; David Aberdeen; David Barry Mobbs, all of Grimsby, and Richard Vyvian Pearse, Cleethorpes, all of England, assignors to Laporte Industries Limited, London, England

Filed Apr. 4, 1972, Ser. No. 241,056
Claims priority, application United Kingdom, Feb. 14, 1972, 6835/72
Int. Cl. C22b *1/00;* **C09g** *23/04;* **C21b** *1/00*
U.S. Cl. 423—86 **16 Claims**

1. A process for beneficiating a weathered ilmenite ore, which comprises forming from the ilmenite under non-oxidizing conditions and without reducing more than 1/15 by weight of the iron content of the ilmenite, a material of which at least 20% by weight comprises pseudobrookite, reducing the said material to yield a material having at least 4% of its iron content (calculated as Fe) in the ferric state, and leaching the reduced material so obtained to yield a beneficiated titaniferous material.

3,875,287
REMOVING MERCURY FROM CONCENTRATED SULFURIC ACID USING IODIDES

Toshio Kurikami, Annaka, Japan, assignor to Toho Aen Kabushiki Kaisha, Tokyo-to, Japan

Filed Aug. 7, 1973, Ser. No. 386,433
Claims priority, application Japan, Aug. 15, 1972, 47-81556; Jan. 29, 1973, 48-11692
Int. Cl. C01g *13/04;* **C01b** *17/90*
U.S. Cl. 423—101 **16 Claims**

1. A method of removing mercury from a highly concentrated sulfuric acid having a concentration of not less than 70 percent and containing a trace of mercury which comprises adding iodides to said sulfuric acid at a temperature up to 45°C to precipitate the mercury contained therein as mercuric iodide, and removing the precipitate from said sulfuric acid.

3,875,288

PRODUCTION OF SYNTHETIC SILICATE MINERALS

George W. Hoffman; H. Michael Blankenship, and William T. Granquist, all of Houston, Tex., assignors to NL Industries, Inc., New York, N.Y.

Filed Aug. 17, 1973, Ser. No. 389,118
Int. Cl. C01f 7/00; C01b 33/00
U.S. Cl. 423—118 11 Claims

1. The process of producing a 2:1 layer-type clay-like mineral product having the empirical formula:

$$nSiO_2{:}Al_2O_3{:}mAB{:}xH_2O$$

where the layer lattices comprise said silica, said alumina, and said B, and where

n is from 1.7 to 3.0,

m is from 0.2 to 0.6,

A is one equivalent of an exchangeable cation chosen from the group consisting of ammonium, sodium, calcium, hydrogen, and mixtures thereof, and is external to the lattice,

B is chosen from the group of anions which consists of F^-, OH^-, $\frac{1}{2}\ O_2^{--}$, and mixtures thereof, and is internal in the lattice, and

x is from 2.0 to 3.5 at 50 percent relative humidity, said mineral being characterized by a d_{001} spacing at said humidity within the range which extends from a lower limit of about 12.0 A. when A is monovalent, to about 14.7 A. when A is divalent, and to a value intermediate between 12.0 A. and 14.7 A. when A includes both monovalent and divalent cations

which comprises the steps of forming a reaction mixture by bringing together a 1:1 clay chosen from the group consisting of calcined kaolinite, calcined halloysite, acid-washed calcined kaolinite, acid-washed calcined halloysite, and mixtures thereof; a cation or mixture of cations chosen from the group consisting of said A, together with an equivalent amount of an anion chosen from the group consisting of hydroxyl and fluoride and mixtures thereof; and water; the relative quantities of said reaction mixture components being selected so as to give a molar ratio of SiO_2/Al_2O_3 of between about 1.9 and 3.2; of F^-/SiO_2 of between about 0.02 and 0.3; and of NH_4^+/Al_2O_3 of between about 0.1 and 2.0; and so as to give a pH of between about 4.5 and 11.5 and a solids/water weight ratio of between about 0.08 to about 0.6; and thereafter heating said reaction mixture under hermetically sealed conditions to a temperature within the range of about 275° C. to about 320° C. and maintaining said mixture within said range for a period of time long enough for said mineral product to form; and thereafter allowing said mineral product to cool and recovering said mineral product.

3,875,289

AMORPHOUS CALCIUM SODIUM PYROPHOSPHATE

Keun Young Kim, Chesterfield, Mo., assignor to Monsanto Co., St. Louis, Mo.

Filed Jan. 28, 1971, Ser. No. 110,605
Int. Cl. C01b 15/16, 25/26
U.S. Cl. 423—306 2 Claims

2. A process for preparing partially dehydrated amorphous calcium sodium pyrophosphate which comprises heating at a temperature within the range of about 175°C to about 400°C calcium sodium pyrophosphate represented by the formula $CaNa_2P_2O_7{\cdot}4H_2O$ until substantially 2 to about 3.9 moles of water of hydration are removed.

3,875,290

PROCESS FOR PREPARING METAL HYDROGEN ION-EXCHANGED CRYSTALLINE ALUMINOSILICATES

John L. Gring, Homewood, Ill., assignor to Atlantic Richfield Company, Philadelphia, Pa.

Filed May 25, 1970, Ser. No. 40,352
Int. Cl. C01b 33/28
U.S. Cl. 423—328 15 Claims

1. A process for preparing metal, hydrogen ion-exchanged crystalline aluminosilicates wherein the metal is selected from the group consisting of aluminum, zirconium and chromium, comprising heating an aqueous slurry of a nitrogen compound forming ammonia on hydrolysis and a water-soluble salt of said metal with a predominantly ammonium-exchanged crystalline aluminosilicate having pores of diameter of about 6A to 15A and a silica-to-alumina mole ratio of about 2 to 20:1 to allow the metal to precipitate within the lattice structure of the aluminosilicate; and calcining the resulting material to form a metal, hydrogen ion-exchanged crystalline aluminosilicate, said process adding about 0.5 to 15 percent by weight of said metal based upon the total weight of the aluminosilicate on an ignited basis.

3,875,291

PROCESS FOR MAKING CRYOLITE

Karl-Heinz Hellberg, and Joachim Massonne, both of Hannover, Germany, assignors to Kali-Chemie Aktiengesellschaft, Hannover, Germany

Filed May 31, 1973, Ser. No. 365,765
Claims priority, application Germany, June 6, 1972, 2227398
Int. Cl. C01f 7/54; C01b 9/08; C01d 3/02
U.S. Cl. 423—465 4 Claims

1. A process for the production of cryolite crystals having a bulk density between 700 and 900 grams per liter which comprises simultaneously adding, to a supersaturated aqueous solution of aluminum fluoride, aqueous solutions of ammonium fluoride and a sodium salt of the group consisting of sodium chloride and sodium sulfate, in such amounts that a ratio between 1 and 1.5 gram atoms of sodium of the sodium salt to each mol of ammonium fluoride is continuously maintained in the reaction mixture and the total amount of each of said solutions that is added is at least sufficient stoichiometrically to convert all of the aluminum fluoride to cryolite, while the reaction mixture is vigorously agitated and its temperature is maintained between 10 and 90°C, and subsequently recovering the cryolite crystals from the resulting reaction mixture.

3,875,292

PREPARATION OF ARSENIC PENTAFLUORIDE AND FLUOROARSENIC ACIDS

Robert A. Wiesboeck, Stone Mountain, and John D. Nickerson, Atlanta, both of Ga., assignors to United States Steel Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 848,119, Aug. 6, 1969, abandoned, which is a continuation-in-part of Ser. No. 702,547, Feb. 2, 1968, abandoned, which is a division of Ser. No. 127,827, March 24, 1971,. This application July 30, 1973, Ser. No. 383,750
Int. Cl. C01b 27/00, 7/00, 9/08
U.S. Cl. 423—472 12 Claims

1. A process for the preparation of AsF_5 and $HAsF_6$ which comprises,

at temperatures in the range of 120°-350°C, reacting a fluorine source selected from the group consisting of (a) alkaline earth fluorosulfonate fluorides, (b) alkali metal fluorosulfonate-fluoride mixtures, (c) mixtures of (a) and (b), and (d) mixtures of alkali metal or alkaline earth fluorides with alkaline earth fluorosulfonates, with

a source of arsenic selected from the group consisting of arsenic acids and fluorinated derivatives thereof, and recovering evolved gases containing said AsF_5 and said $HAsF_6$

the molar reactant ratio of said arsenic source to said fluorine source being in the ratio of about 1:2 to about 1:8.

3,875,293

RECOVERY OF BROMINE FROM ORGANIC BROMIDES

Ralph A. Davis, Midland, Mich., assignor to The Dow Chemical Co., Midland, Mich.

Filed Dec. 7, 1970, Ser. No. 95,883
Int. Cl. C01b *7/12*
U.S. Cl. 423—481 **34 Claims**

1. A process which comprises reacting an organic bromide with hydrogen at a temperature within the range from about 300° to about 600°C. in the presence of a catalyst, said catalyst being selected from two or more of the oxides of chromium, vanadium, tungsten, cerium, molybdenum or aluminum; and separating HBr from the reaction product.

3,875,294

PROCESS FOR CATALYTICALLY REACTING GASES HAVING A HIGH SULFUR DIOXIDE CONTENT

Lothar Reh, Bergen-Enkheim; Karl Vydra, Bad Nauheim; Karl-Heinz Doerr, Mainz; Hugo Grimm, Frankfurt am Main, and Karl-Heinz Hennenberger, Hamburg, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main and Norddeutsche Affinerie, Hamburg, both of, Germany

Filed Mar. 13, 1973, Ser. No. 340,784
Claims priority, application Germany, Mar. 21, 1972, 2213578
Int. Cl. C01b *17/78*
U.S. Cl. 423—534 **10 Claims**

1. Process for reacting gases having a sulfur dioxide content of 15–16 percent by volume with oxygen to form sulfur trioxide which comprises reacting said gases containing sulfur dioxide with oxygen in a plurality of stages, with cooling of the gases between each of the stages, in flowing contact with catalyst bodies contained in contacting trays in each of the stages, the ratio of the surface of the catalyst bodies to actual volume of the catalyst bodies contacted by the flowing gas being 120–400 meters^{-1} and the residence time in each contracting tray being 0.03–0.5 second and at temperatures below which the catalyst deteriorates due to heat.

3,875,295

PROCESS FOR WITHDRAWING HYDROGEN SULFIDE FROM AN INDUSTRIAL GAS WITH SULFUR PRODUCTION

Yves Barthel, Paris; Sigismond Franckowiak, Montesson, and Philippe Renault, Noisy-Le-Roi, all of France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants, Rueil-Malmaison, France

Filed May 30, 1973, Ser. No. 365,291
Claims priority, application France, June 1, 1972, 72.19808
Int. Cl. C01b *17/04*
U.S. Cl. 423—575 **10 Claims**

1. A process for removing hydrogen sulfide from an H_2S-containing industrial gas while concurrently producing sulfur, said process comprising:

a. reacting said H_2S-containing industrial gas in a reaction mixture containing an organic solvent with an SO_2-containing gas, the molar ratio of the H_2S : SO_2 reactants being 2.5 : 1 to 4 : 1, respectively, to produce sulfur and an effluent gas containing H_2S;
b. removing the sulfur from the reaction mixture;
c. passing said effluent gas into contact with a solution of H_2S-absorbing agent to obtain an H_2S-depleted gaseous effluent and an H_2S-containing solution;
d. desorbing said H_2S-containing solution to obtain H_2S;
e. burning said H_2S with a gas containing molecular oxygen to form sulfur dioxide; and
f. utilizing resultant sulfur dioxide as said SO_2-containing gas in step (a).

3,875,296

METHOD OF PREPARING METAL OXIDE FIBERS

Burton D. Brubaker, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. Nos. 622,046, March 10, 1967, abandoned, and Ser. No. 28,103, April 13, 1970, Pat. No. 3,711,599. This application Jan. 2, 1973, Ser. No. 320,677
Int. Cl. C01g *53/04*
U.S. Cl. 423—592 **36 Claims**

1. A method for preparing nickel oxide fibers which comprises: forming a molten film of a mixture of a nickel salt with at least one auxiliary salt selected from the group consisting of alkali metal chlorides, alkali metal bromides, alkali metal sulfates, and calcium, barium or strontium chlorides, the proportion of nickel salt in the mixture being up to about 80 mole percent; reacting the mixture with water vapor at a temperature within the range of from about 700°C to about 1200°C to initiate growth of the metal oxide fibers; continually supplying the molten film of the mixture over the fibers to sustain growth; and separating the metal oxide fibers from any residual mixture.

19. A method for preparing nickel oxide fibers which comprises:

a. providing a mixture containing up to about 80 mole percent of a nickel salt and an auxiliary salt selected from at least one member of the group consisting of alkali metal chlorides and bromides, alkali metal sulfates, and calcium, barium or strontium chlorides, provided that the auxiliary salt includes less than about 60 mole percent calcium chloride and less than about 80 mole percent of a lithium chloride;
b. forming a nucleus of metal oxide on a solid substrate wetted by a molten mixture of step (a) by reacting the molten mixture with water vapor at a temperature within the range of 700°C to about 1200°C;
c. forming a molten film with the mixture of step (a) over the nucleus;
d. reacting at least a portion of the film over the nucleus with water vapor at a temperature within the range of about 700°C to about 1200°C to thereby produce a fiber by substantially unidirectional growth of the metal oxide reaction product;
e. continually supplying the molten film over the fiber ends for at least about 15 minutes to sustain substantially unidirectional growth of the metal oxide; and
f. separating the metal oxide fibers from any residual mixture.

3,875,297

METHOD FOR MAKING FERROMAGNETIC CHROMIUM DIOXIDE

Harry Robbins, Los Angeles, Calif., assignor to Eastman Kodak Co., Rochester, N.Y.

Filed July 18, 1973, Ser. No. 380,450
Int. Cl. C01g *37/02*
U.S. Cl. 423—607 **5 Claims**

1. A process for preparing ferromagnetic chromium oxide which comprises placing chromic nitrate in a closed vessel under an initial oxygen pressure of at least 500 p.s.i. and then heating said chromic nitrate and oxygen at a temperature of about 250° to about 500°C for a time sufficient to increase said pressure and form upon separating and drying, ferromagnetic chromium dioxide as the resulting product.

3,875,298

CALCINATION OF STRONTIUM CARBONATE

Richard L. Coatney, Pleasanton; Lloyd M. Housh, Santa Clara, and Merton L. Van Dreser, Pleasanton, all of Calif., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed July 17, 1973, Ser. No. 380,112
Int. Cl. C01f 11/06
U.S. Cl. 423—637 16 Claims

1. Method of calcining strontium carbonate in a rotary kiln to form strontium oxide comprising:

1. selecting a strontium carbonate substantially all of which passes a 200 mesh screen and at least 85 percent of which passes a 325 mesh screen;
2. admixing the strontium carbonate with at least 8 percent by weight, based on the weight of the strontium carbonate, carbon substantially all of which passes a 65 mesh screen, at least 75 percent of which passes a 100 mesh screen, and at least 25 percent of which is retained on a 200 mesh screen;
3. feeding the admixture to a rotary kiln without the addition of other ingredients such as limestone; and
4. calcining the admixture at a temperature of at least 1150°C under conditions that produce not less than 2 percent combustibles in the kiln exit gases.

3,875,299

TECHNETIUM LABELED TIN COLLOID RADIOPHARMACEUTICALS

Harry S. Winchell, Lafayette; Morton Barak, and Parmer Van Fleet, III, both of Walnut Creek, all of Calif., assignors to Medi-Physics, Inc., Nutley, N.J.

Filed May 5, 1972, Ser. No. 250,738
Int. Cl. A61k 27/04
U.S. Cl. 424—1 5 Claims

1. A 99m-technetium labeled tin(II) colloid which colloid is size-stabilized for scintigraphic imaging of reticuloendothelial organs including the liver, spleen and bone marrow without the presence of macromolecular stabilizers comprising mixed solutions of

hydrolized stannous chloride with its tin ions substantially maintained in their reduced tin(II) state; and

99m-technetium-pertechnetate in normal saline solution, the solutions being mixed at room temperature.

3,875,300

COMPOSITIN FOR SUSTAINED RELEASE OF A MEDICAMENT AND METHOD OF USING SAME

Roger Homm, Neshanic, and Gilbert Katz, Boonton, both of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Dec. 18, 1972, Ser. No. 316,175
Int. Cl. A61l 19/00
U.S. Cl. 424—28 14 Claims

1. A composition of matter comprising an intimate admixture of a thermoplastic, physiologically-inert hydroxypropyl cellulose or hydroxypropylmethyl cellulose polymer soluble in vaginal fluids shaped as an intra-vaginal medicament applicator and up to 30 weight percent of a vaginal medicament, said intimate mixture having been melt spun by being melted, spun, cast, molded or extruded in the molten state into a fibrous mass of fine fibers, strands, pellets, balls or wads, the entire mass totally dissolving in said vaginal fluid within about 24 hours.

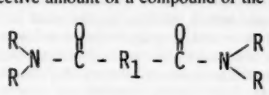
3,875,301

USEFUL TETRAALKYL DIAMINES IN THE TREATMENT OF POISON IVY

John J. Windheuser, Lawrence, Kans., assignor to Interx Research Corporation, Lawrence, Kans.

Filed Apr. 30, 1974, Ser. No. 465,527
Int. Cl. A61k 27/00; A61l 23/00
U.S. Cl. 424—45 11 Claims

1. A method of reducing poison ivy dermatitis on a warm-blooded animal, which comprises applying to the dermatitic area, an effective amount of a compound of the formula:



wherein each R represents a member selected from the group consisting of a saturated aliphatic hydrocarbon group of from 1 to 6 carbon atoms and an unsaturated aliphatic hydrocarbon group of from 1 to 6 carbon atoms, and wherein R_1 represents a member selected from the group consisting of a saturated aliphatic hydrocarbon group of from 0 to 22 carbon atoms and an unsaturated aliphatic hydrocarbon group of from 0 to 22 carbon atoms,

whereby said compound forms a molecular complex with urushiol, the causative agent of said dermatitis.

3,875,302

GELLED VINYL ALCOHOL POLYMERS AND ARTICLES THEREFROM

Taisei Inoue, Tokyo, Japan, assignor to Kuraray Co., Ltd., Kurashiki, Japan

Continuation of Ser. No. 178,979, Sept. 9, 1971, abandoned. This application Aug. 7, 1973, Ser. No. 386,473
Claims priority, application Japan, Sept. 16, 1970, 45-81410; Mar. 26, 1971, 46-18116
Int. Cl. A01n 17/14
U.S. Cl. 426—1 8 Claims

1. A gelled polyvinyl alcohol polymer having a degree of polymerization of between about 500 and 2000 and containing a fish attractant, said gelled polyvinyl alcohol polymer having a ratio of water content to solids content similar to raw fish bait and a flexibility and softness similar to raw fish bait and exhibiting retarded leaching of said fish attractant, said gelled polyvinyl alcohol polymer prepared by a process comprising admixing said fish attractant with an aqueous solution consisting essentially of water and from about 5 to about 40 wt.% of a vinyl alcohol polymer, freezing said admixture at a temperature below about −5°C. for a period of from about 10 to about 50 hours, and melting the resultant frozen solution to obtain said fish attractant-containing gelled polyvinyl alcohol polymer.

3,875,303

PREPARATION OF BEER

Josef Hieber, East Northport, N.Y., assignor to Interbrew Betriebs- und Beteilgungs - AG, Solothurn, Switzerland

Continuation of Ser. No. 240,977, April 4, 1972, abandoned, which is a continuation-in-part of Ser. No. 883,669, Dec. 22, 1969, abandoned, which is a continuation of Ser. No. 523,066, Jan. 26, 1966, abandoned. This application Nov. 29, 1973, Ser. No. 420,165
Claims priority, application Switzerland, Jan. 28, 1967, 1221/65
Int. Cl. C12c 11/04
U.S. Cl. 426—16 13 Claims

1. A process for the production of beer by dissolving a beer wort concentrate in water and attenuating the same with brewer's yeast, said process comprising sterilizing and desalting water; providing the sterilized and desalted water with a controlled salt content; dissolving wort concentrate having at least 80% dry substance in said water in the absence of external heating to obtain a fermentable wort, said dissolving of the

wort concentrate in the water including the steps of pumping the water at a determinable rate and pressure in the form of a jet, and drawing the wort concentrate into the jet of water, by injection; fermenting said wort obtained from the jet with yeast at low temperature and under pressure, and aging and racking the resulting beer, said fermentating of the wort being effected in a closed vessel containing a cylindrical cooling chamber located above a centrifuge drum having plates therein for separating yeast and having an impeller therein for circulating wort, and including the steps of introducing dissolved wort into the vessel at the bottom thereof at least to partially fill said vessel, introducing the yeast into the centrifuge drum in the vessel, mixing the yeast and wort by rotating said impeller to circulate the wort upward through the interiors of the centrifuge drum and the cooling chamber and over the upper edge of the cooling chamber and downward through an outer space between the interior vessel wall and the outer walls of the centrifuge drum and the cooling chamber to the bottom of the vessel where the wort enters the bottom of the centrifuge drum to flow upward through the centrifuge drum and the cooling chamber, and removing yeast after fermentation from said vessel by centrifugation in said centrifuge drum by rotation of said plates.

3,875,304

LIVESTOCK FEED COMPOSITION AND METHOD OF PREPARING THE SAME

Lenard A. Hunt, Elm Grove, and Eugene H. Spitzer, Burlington, both of Wis., assignors to Jos. Schlitz Brewing Co., Milwaukee, Wis.

Continuation-in-part of Ser. No. 31,797, April 24, 1970, abandoned. This application Nov. 2, 1972, Ser. No. 303,076

Int. Cl. A23k *1/06*

U.S. Cl. 426—31 **9 Claims**

1. A method of preparing a livestock feed composition comprising the steps of, reducing the moisture content of brewer's wet grain having a moisture content of over 80 percent by weight to a value of below 70 percent by weight, intimately mixing the brewer's wet grain of the reduced moisture content, a high-carbohydrate livestock feed material and a mineral supplement containing buffering compounds to provide a blend having a moisture content of 35 percent to about 58 percent by weight, said blend containing on a dry basis from 12 to 70 percent by weight of said brewer's wet grain, 25 to 80 percent by weight of said carbohydrate feed material and 1 to 5 percent by weight of said mineral supplement and having a protein content above 10 percent by weight on a dry basis, fermenting the blend under substantially anaerobic conditions to provide a fermented silage; and buffering the pH of the silage through the action of the buffering compounds in the mineral supplement during fermentation so that the silage has a pH in the range of 4.0 to 4.5, said silage having improved palatability to the livestock and increased stability against spoilage.

3,875,305

PRODUCTION OF CHEDDAR CHEESE

Arnold B. Storrs, Solon Mills, Ill., assignor to Lacto Products Co., Inc., Milwaukee, Wis.

Filed July 16, 1973, Ser. No. 379,481

Int. Cl. A23c *19/02*

U.S. Cl. 426—38 **7 Claims**

1. A process for preparing a cheddar cheese which includes the steps of coagulating milk with a lactic-acid producing starting culture to form a curd, cutting the curd, cooking the curd, separating the curd from the whey portion of the milk, hooping the curd, and aging to produce a cheese, wherein the improvement comprises admixing a *Streptococcus diacetilactis* culture with the separated curd prior to hooping, the amount of said culture being at least 1 part per million parts of said curd.

3,875,306

ANIMAL FEED SUPPLEMENT

Eric Ingemar Alstrom, Sundbyberg, Sweden, assignor to Wenner-Gren Medical Laboratory Aktiebolag Sturegatan, Stockholm, Sweden

Continuation-in-part of Ser. No. 872,467, Nov. 24, 1969, abandoned, which is a continuation of Ser. No. 523,534, June 28, 1966, abandoned. This application Nov. 1, 1971, Ser. No. 194,617

Int. Cl. A23k *1/00*

U.S. Cl. 426—61 **5 Claims**

1. The method of producing an animal feed additive consisting essentially of a combination of viable *Lactobacillus bulgaricus* and *Streptococcus thermophilus* and metabolic products formed during cultivation of said bacteria, comprising the steps of cultivating a mixed culture of *Lactobacillus bulgaricus and Streptococcus thermophilus* for a period in the range of from about 2 to 5 hours on skim milk or whole milk, whey or bouillon, interrupting the cultivation and cooling the culture, and thereafter drying the culture to a powder at a sufficiently low temperature to keep the bacteria of both species viable.

3,875,307

FLAVORING FOODSTUFFS WITH A MIXTURE CONTAINING 1,2 CYCLOHEXANEDIONE

John Wolt, East Orange, N.J.; Christopher Giacino, Abrahamsville, Pa.; Alton Dewitt Quinn, Calicoon; Edward J. Shuster, Brooklyn, both of N.Y., and Joaquin F. Vinals, Red Bank, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed May 14, 1973, Ser. No. 359,679

Int. Cl. A23l *1/26*

U.S. Cl. 426—65 **2 Claims**

1. A process for altering the flavor properties of a foodstuff which comprises adding thereto in an amount of from 0.5 ppm up to 50 ppm, a composition comprising 1,2-cyclohexanedione and a second cyclic diketone selected from the group consisting of ethyl maltol, ethyl cyclotene, methyl cyclopentenolone butyrate, maltol, cyclotene and 2,5-dimethyl-4-hydroxy-3 (2H)-furanone, the amount of 1,2 cyclohexanedione in said foodstuff being in a concentration of at least 0.1 ppm.

3,875,308

FOOD COMPOSITIONS CONTAINING PULLULAN

Koso Kato, and Makota Shiosaka, both of Okayama, Japan, assignors to Hayashibara Biochemical Laboratories, Incorporated, Okayama, Japan

Filed Jan. 2, 1973, Ser. No. 319,996

Claims priority, application Japan, Jan. 13, 1972, 47-5580

Int. Cl. A21d *13/06*

U.S. Cl. 426—152 **5 Claims**

1. A food composition including at least 0.05% pullulan by weight, said pullulan being uniformly distributed in said composition and of a purity sufficient to have a bland taste and odor.

3,875,309

DRY MIX FOR FROSTED BROWNIES

James H. Johannes, Minneapolis, Minn., assignor to General Mills, Inc., Minneapolis, Minn.

Filed Dec. 3, 1973, Ser. No. 420,820

Int. Cl. A21d *13/00*

U.S. Cl. 426—152 **4 Claims**

1. A brownie dry mix consisting essentially of:

about 45 to 55 percent sucrose by weight of the brownie dry mix composition,

about 20 to 22 percent wheat flour by weight of the brownie dry mix composition, said wheat flour having a protein level of about 10 to 10.5 percent by weight of the wheat flour,

about 12 to 18 percent shortening by weight of the brownie dry mix composition, said shortening having a solid fat index of about:

Temperature, °F.	SFI, %
50	29–33
70	21–24
80	19–22
92	14–17
104	8–10

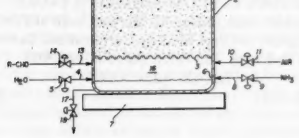
about 5 to 10 percent cocoa by weight of the brownie dry mix composition, and

about 0.5 to 2.5 percent starch by weight of the brownie dry mix composition, said starch being selected from corn and wheat starch.

3,875,310
RUMINANT FEED SUPPLEMENT COMPRISING AN AMMONIATED PROTEIN-ALDEHYDE COMPLEX

Robert M. Rawlings, 901 Imperial Plaza, 200 N. 3rd, Nampa, Idaho, and Frank N. Rawlings, Rt. 4, Boise, Idaho 83651

Filed Mar. 8, 1974, Ser. No. 449,503
Int. Cl. A23k *1/18, 1/22*
U.S. Cl. 426—210 **19 Claims**



1. A feed supplement for ruminanats consisting essentially of:

an oil seed material containing naturally dispersed unsaturated lipids within a proteinaceous material which has been reacted with an aldehyde selected from the group of hydrocarbons containing at least one aldehyde group which is available for reaction with said proteinaceous material, after said proteinaceous material has been activated with ammonia by contact with said ammonia to form an ammoniated protein-aldehyde complex which is substantially insoluble at pH levels greater than about 5 and substantially soluble at pH levels less than about 4.

3,875,311
CALORIE-FREE DIPEPTIDE SWEETENING COMPOSITION

Marvin E. Eisenstadt, Belle Harbor, N.Y., assignor to Cumberland Packing Corporation, Brooklyn, N.Y.

Continuation-in-part of Ser. No. 375,697, July 2, 1973,. This application July 2, 1973, Ser. No. 375,696
Int. Cl. A23l *1/26*
U.S. Cl. 426—212 **10 Claims**

1. A sweetening composition consisting essentially of (a) dipeptide sweetener, (b) at least one agent selected from the group consisting of potassium bitartrate, sodium bicarbonate and potassium bicarbonate, and (c) at least one compound selected from the group consisting of glucono delta lactone, sodium gluconate and potassium gluconate, in proportions by weight of about 1/25–6 parts (b) per each part of (a) and about 5–50 parts of (c) per each part of (a).

3,875,312
DIPEPTIDE SWEETENER COMPOSITION

Marvin E. Eisenstadt, Belle Harbor, N.Y., assignor to Cumberland Packing Corporation, Brooklyn, N.Y.

Continuation-in-part of Ser. No. 320,210, Jan. 2, 1973, abandoned. This application July 2, 1973, Ser. No. 375,697
Int. Cl. A23l *1/26*
U.S. Cl. 426—212 **10 Claims**

1. A sweetening composition consisting essentially of (a) dipeptide sweetener, (b) at least one agent selected from the group consisting of potassium bitartrate, sodium bicarbonate and potassium bicarbonate, and (c) at least one compound selected from the group consisting of lactose and dextrose, in proportions by weight of about 0.1–10 parts (b) per each part of (a) and about 5–30 parts of (c) per each part of (a).

3,875,313
METHOD OF TREATING MEAT

Eugene Brotsky, Highland Park, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 356,007, April 30, 1973, abandoned, which is a continuation-in-part of Ser. No. 93,418, Nov. 27, 1970, abandoned. This application Aug. 12, 1974, Ser. No. 496,777
Int. Cl. A22c *18/00;* **A23b** *1/00*
U.S. Cl. 426—265 **2 Claims**

2. The method of treating meat to maintain the color, taste and fresh quality thereof which comprises adding to such meat prior to cold or frozen storage from 0.2 to 0.6 percent by weight of the meat of a dry, homogeneous, free-flowing sodium tripolyphosphate hexahydrate in which the water of hydration contains lemon juice solids in an amount equivalent to one part by weight per 7 to 70 parts by weight of the sodium tripolyphosphate.

3,875,314
LIQUID SMOKE AND METHOD FOR MANUFACTURE

Hugo E. Wistreich, and Hyunil Juhn, both of Chicago, Ill., assignors to B. Heller & Company, Chicago, Ill.

Filed Jan. 31, 1973, Ser. No. 328,418
Int. Cl. A23b *1/04*
U.S. Cl. 426—342 **16 Claims**

1. In the preparation of liquid smoke, the steps of treating wood particles with acetic acid uniformly to distribute the acetic acid throughout the wood particles, heating the wood particles to a carbonization temperature in a carbonizing atmosphere, to reduce the treated wood particles with the corresponding generation of an exhaust containing smoke particles and vapors, and then subjecting the exhaust to an extraction with aqueous medium for the removal of smoke particles and vapors.

3,875,315
TREATMENT OF WHEY WITH SURFACTANTS

John R. Moneymaker, and Bert W. Landfried, both of Overland Park, Kans., assignors to Top-Scor Products, Inc., Kansas City, Kans.

Filed May 7, 1973, Ser. No. 358,086
Int. Cl. A21d *13/00;* **A23c** *21/00*
U.S. Cl. 426—343 **6 Claims**

1. A method of producing bakery products comprising the steps of:

a. introducing an edible, non-ionic, water dispersible surfactant taken from the group consisting of polyoxyethylene (20) mono-diglyceride and polyoxyethylene (20) sorbitan monostearate into an aqueous whey solution to form an aqueous mixture in an amount equal to approximately 0.5% to 5.0% based upon the dry weight of the mixture,

b. agitating the aqueous mixture to achieve dispersion,

c. drying the mixture, and

d. incorporating the dried mixture in a substantial amount in a flour-containing mixture to form a dough, and baking the dough.

3,875,316

PREPARATION OF ISOMERIZED HOP EXTRACTS

Anthony Martin Humphrey, Uxbridge, England, assignor to Bush Boake Allen Limited, Walthamstow, England

Filed Aug. 3, 1972, Ser. No. 277,848

Claims priority, application United Kingdom, Aug. 4, 1971, 36554/71; Mar. 15, 1972, 12064/72

Int. Cl. C12c *9/02*

U.S. Cl. 426—349 **18 Claims**

1. A method of isomerizing α-acids which comprises contacting a solution consisting essentially of an α-acids-containing unisomerised hop extract in a water immiscible organic solvent with a substantially stoichiometric amount of a base selected from the group consisting of the oxides, hydroxides and carbonates of calcium, magnesium, strontium, barium and zinc, to form the corresponding salt of the α-acids and heating the mixture sufficiently to form the corresponding salt of the iso-α-acids, and recovering an isomerised hop extract containing said salt of the iso-α-acids from the water immiscible solvent.

3,875,317

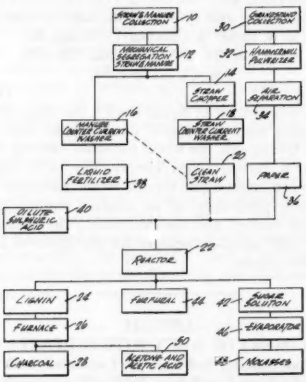
WASTE CONVERSION PROCESS

Stuart R. Ferguson, 1140 San Ysidro, Beverly Hills, Calif. 90210

Filed Sept. 17, 1971, Ser. No. 181,319

Int. Cl. A23k *1/00*

U.S. Cl. 426—373 **4 Claims**



1. A method of converting waste of stable manure and straw comprising the steps of:

1. separating soluble contents of manure from straw for subsequent utilization as fertilizer,
2. chopping and washing the straw and insoluble contents of manure,
3. subjecting said straw and manure insoluble contents to acid, temperature and pressure for hydrolysis thereof in a pressure container for conversion thereof into a sugar solution and a residue, and
4. quickly reducing the pressure on said residue to permit rapid expansion thereof into a lower density mixture.

3,875,318

ASEPTIC CANNING METHOD

Elmer S. Davies, 7116 Cedar Ave., Takoma Park, Md. 20012

Filed Mar. 8, 1973, Ser. No. 339,290

Int. Cl. A23b ; B65b *55/10*

U.S. Cl. 426—397 **4 Claims**

1. An aseptic canning method for filling and sealing vent hole cans with a sterile liquid product in which each can includes a can and lid which have been previously joined to form a closed can except for a small vent hole located centrally in the lid, said method consisting of the steps of supplying said vent hole cans, introducing a small quantity of water sufficient to generate superheated steam into the interior of each can through the small vent hole in the lid, applying heat externally of the can for converting the water to superheated steam thereby sterilizing the interior surface of the can, subjecting the hot can with superheated steam therein to cool sterile inert gas above atmospheric pressure whereby the gas cools the can with condensation of the steam and reduced pressure in the can causing the inert gas to substantially fill the can by being drawn in through the small vent hole in the lid, filling the can with sterile product through said vent hole while maintaining an inert gas atmosphere whereby the product entering the can expels the inert gas from the can with any head space between the can lid and the product being filled by inert gas, and closing the vent hole in the lid of the vent hole can while maintaining an atmosphere of inert gas.

3,875,319

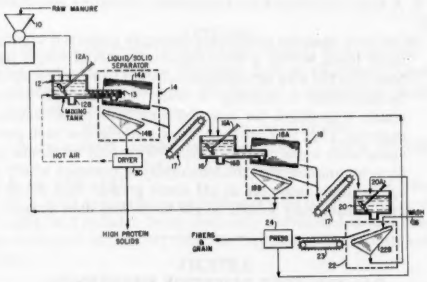
PROCESS AND APPARATUS FOR RECOVERING FEED PRODUCTS FROM ANIMAL MANURE

David W. Seckler, and Judson M. Harper, both of Fort Collins, Colo., assignors to Ceres Ecology Corporation, Denver, Colo.

Filed Aug. 16, 1973, Ser. No. 388,902

Int. Cl. A23k *1/00*

U.S. Cl. 426—431 **8 Claims**

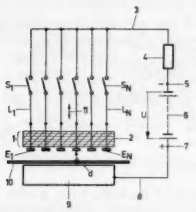


1. A process for recovering feed products from manure, comprising forming a first water-manure slurry, separating said first slurry into liquid and solid fractions, forming at least one additional water-manure slurry by mixing the solid fraction from the first slurry with water, separating liquid and solid fractions of said additional slurry, adding at least part of the separated liquid fraction of the additional slurry to the first slurry, and evaporating water in the liquid fraction of the first slurry to separate nutrients therefrom.

3,875,320
PROCESS FOR ELECTROSTATIC PRINTING, PRODUCTS PRODUCED BY SUCH PROCESS, AND USE OF THESE PRODUCTS

Gabor Forgo; Erwin Meyer, and Karl Moser, all of Zurich, Switzerland, assignors to Zellweger AG., Uster, Switzerland

Filed July 14, 1972, Ser. No. 272,067
Claims priority, application Switzerland, Aug. 16, 1971, 12104/71
Int. Cl. G03g *13/08, 13/22, 15/08, 15/22*
U.S. Cl. 427—19 27 Claims



1. A process for producing printed images by electrostatic printing techniques, comprising the steps of producing a latent electrostatic charge image on a carrier by means of a discharge from an electrode means composed of individual electrodes, during at least a portion of the time span during which the discharge occurs for producing the latent electrostatic charge image on the carrier carrying out between the electrode means and the carrier relative movement in alternate directions with movement components essentially parallel to the plane of the carrier, producing by means of said relative movement in alternate directions occurring between the electrode means and the carrier a latent electrostatic charge image which is larger in size than the size of the width of the individual electrodes of the electrode means participating in the formation of such electrostatic charge image, and then applying toner to the thus produced electrostatic charge image to form a developed image, and fixing said developed image to said carrier.

3,875,321
GLASSY OR CRYSTALLINE MATERIAL FOR PHOTOTROPIC THIN LAYERS

Georg Gliemeroth, Mainz-Mombach, and Lothar Meckel, Ostrich, both of Germany, assignors to JENAer Glaswerk Schott & Gen., Mainz, Germany

Filed Apr. 25, 1973, Ser. No. 354,628
Int. Cl. B29d *11/00*; F21u *9/00*; G03c *1/52*
U.S. Cl. 428—432 13 Claims

1. An article comprising a substrate forming a body portion of the article and a reversible phototropic coating on the substrate, the coating comprising a fused glassy or crystalline composition of the system silver cations, at least one of chlorine and bromine anions, copper cations, the proportion of the components of said system referred to a batch of compounds of silver and the anion and of copper and the anion melted to produce a fused material for application as the coating, being about 5–58 mole % silver cations, about 8–85 mole % of said anions, and about 2–60 mole % of copper cations.

8. Solid, glassy or crystalline composition which when applied as a coating to a substrate has reversible phototropic properties, comprising a fused composition of the system silver cations, at least one of chlorine and bromine anions, copper cations, the proportion of the components of said system referred to a batch of compounds of silver and the anion and of copper and the anion melted to produce a fused material for application as the coating, being about 5–58 mole % silver cations, about 8–85 mole % of said anions, and about 2–60 mole % of copper cations.

3,875,322
ELECTRIC INDUCTION FURNACE HEARTH FOR CONTAINING METAL MELT

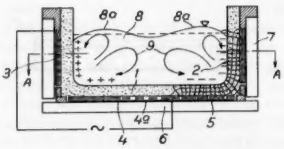
Yngve Sundberg, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Jan. 21, 1974, Ser. No. 434,886

Claims priority, application Sweden, Jan. 31, 1973, 73013112

Int. Cl. H05b *5/12*

U.S. Cl. 13—27 **7 Claims**



1. An electric induction furnace hearth for containing a metal melt and formed by refractory side and substantially flat bottom walls, and at least one substantially flat electric induction coil means positioned at least partially under said bottom wall with the latter structurally connected therewith and at least partially supported thereby against the weight of said melt when the latter is contained in said hearth.

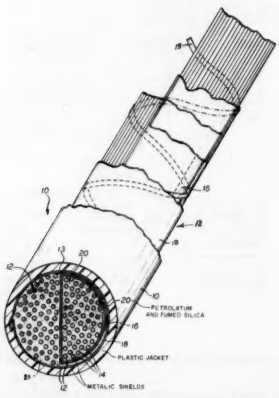
3,875,323
WATERPROOF TELEPHONE CABLES WITH PLIABLE NON-FLOWING FILLING COMPOUND

Louis A. Bopp, Fair Haven; Ludwik Jachimowicz, Elizabeth, and Gertraud A. Schmidt, Long Beach, all of N.J., assignors to General Cable Corporation, Greenwich, Conn.

Filed Oct. 1, 1973, Ser. No. 402,389

Int. Cl. H01b *7/02*

U.S. Cl. 174—23 C **14 Claims**



1. A filled communication cable including in combination a plurality of insulated conductors assembled in a cable core having an outer shield surrounding the conductors, filler material in the core in spaces between the insulated conductors, the filler material comprising a mixture of petrolatum and fumed silica, having a particle size that provides about 200 square meters per gram of surface area and having thixotropic properties that raise the drip point of the material.

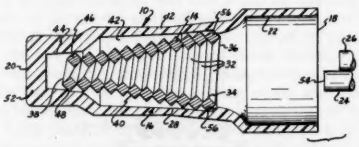
3,875,324
WIRE CONNECTOR

William T. Waddington, Fanwood, and Charles F. Mazzeo, Scotch Plains, both of N.J., assignors to Amerace Corporation, New York, N.Y.

Filed May 31, 1973, Ser. No. 365,548

Int. Cl. H01r *5/12;* **H02g** *15/08*

U.S. Cl. 174—87 **1 Claim**



1. As an article of manufacture, a wire connector for securing a connection between electrical wire ends by rotational installation over the wire ends, said wire connector comprising:

a helically coiled spring member extending longitudinally from a larger diameter first end toward a smaller diameter second end, said member being generally tapered longitudinally along a central portion thereof between said ends and having a plurality of convolutions;

a housing having a wall of relatively rigid insulating material, said housing having a cavity containing said spring member, the cavity having a configuration generally complementary to the external configuration of the spring member with the relative dimensions of the cavity and the spring member providing a clearance space between the housing and the central portion of the spring member, said wall having a predetermined wall thickness along the portion of the length thereof corresponding to the tapered longitudinal central portion of the spring member;

said housing including a lip projecting into the cavity adjacent the first end of the spring member and retaining the spring member within the cavity prior to said rotational installation, and an end wall adjacent the second end of the spring member; and

coupling means for transmitting installation torque from the housing to the spring member, upon said rotational installation, and subsequently precluding relative longitudinal movement between the spring member and the housing, said coupling means consisting of:

an unthreaded end portion of said cavity, said end portion having a given inside diameter at the outside periphery of at least one convolution adjacent said second end of the spring member, the thickness of the wall at the unthreaded end portion of the cavity and at said end wall being greater than said predetermined wall thickness; and

a thread-forming edge along the outside periphery of at least said one convolution adjacent the second end of the spring member, said thread-forming edge having an outside diameter larger than the given inside diameter of the unthreaded end portion of the cavity by an amount great enough to enable, upon rotation of the housing relative to the spring member in the direction of said installation, the formation of a complementary thread of sufficient depth in the thicker housing wall at said unthreaded end portion to establish a threaded engagement between the said one convolution and said housing of a strength great enough to transmit said

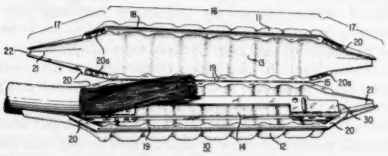
installation torque and preclude said longitudinal movement;

said one convolution having an inside diameter small enough to preclude the passage through the convolution of a wire having sufficient column strength to pierce the end wall.

3,875,325
TELEPHONE SPLICE CLOSURE

Charles Victor Anderson, Doraville; Mills Lawrence Fleming, Lawrenceville; George Anthony Kotzias, Doraville; Robert Rogers Ross, Gainesville, and James Luchin Williams, Doraville, all of Ga., assignors to Western Electric Company, New York, N.Y., by said Anderson, Fleming and Kotzias and Bell Telephone Laboratories, Incorporated, Murray Hill, N.Y., by said Ross and Williams

Filed June 10, 1974, Ser. No. 477,598
Int. Cl. H02g *15/08*
U.S. Cl. 174—92 **11 Claims**



1. A splice closure for enclosing a splice of multipair telephone cables, comprising:

first and second elongate shells each including

a semi-cylindrical interior cavity;

two end mouths each shaped as a tapered half-cone and each mouth including at least one inwardly extending slits;

flat planar edges extending outwardly from the rims adjacent said cavity in parallel relation and in converging relation beyond said cavity; means matably securing said first and second shells along their respective said edges; and

a rigid bar disposed within said shell for supporting cables and splices within the mated shells, comprising:

first and second flat members joined at an angle to each other by end flanges;

the area between said end flanges and said sides defining an elongate opening capable of passing gel-like fill therethrough.

3,875,326
EXPLOSIVELY OPERATED WELDING CARTRIDGE

Peter Hofer, Hofen, Switzerland, assignor to Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland

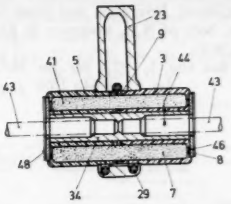
Filed Feb. 12, 1973, Ser. No. 331,883
Claims priority, application Switzerland, Feb. 29, 1972, 002920/72
Int. Cl. H02q *15/08*
U.S. Cl. 174—94 R **18 Claims**

1. An explosion welding cartridge for joining metallic components, which comprises:

a hollow receptacle substantially symmetrical about its axis, said hollow receptacle consisting of a pair of parts which fit together, each of said parts including an inner annular wall and an outer annular wall which define an annular space therebetween, said inner annular wall defining a central aperture;

an explosive charge arranged within said annular space in said receptacle in the form of a closed ring;

a connecting element extending through said central aperture and including recesses at opposite ends thereof for receiving the metallic components to be connected, each recess comprising a first axial opening extending inwardly from the respective end of said connecting element and a second axial opening of smaller cross section than said first axial opening extending inwardly from said first axial opening and terminating in a reduced section to limit



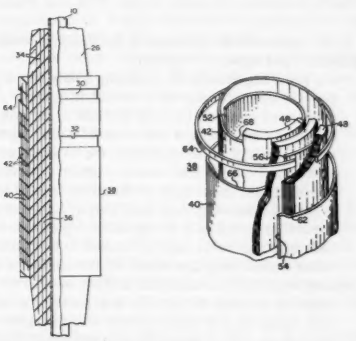
inward movement of the metallic components into said connecting element; and

means for detonating said explosive charge to join said connecting element to the metallic components.

3,875,327
ELECTRICAL BUSHING HAVING A SPIRAL TAP ASSEMBLY

Jerry L. Hildenbrand, Muncie, Ind., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 6, 1974, Ser. No. 477,113
Int. Cl. H01b *17/28*
U.S. Cl. 174—143 **5 Claims**



1. An electrical bushing comprising:

a longitudinal conductor;

terminal means located at each end of the longitudinal conductor for connecting associated electrical leads to the longitudinal conductor;

a hollow insulating structure disposed between each terminal means and around the longitudinal conductor;

a stress grading condenser system disposed around the longitudinal conductor;

a tap layer comprising a conductive sheet spirally wound around the condenser system for more than one turn, thereby providing radially overlapped and overlapping portions of the tap layer, said tap layer having top and bottom axial ends and inside and outside radial ends;

a ground layer comprising a conductive sheet spirally wrapped around the condenser system for more than one turn, with a portion of the ground layer located radially between the overlapped and overlapping portions of the tap layer, said ground layer having top and bottom axial ends and inside and outside radial ends, with the top axial end of the tap layer extending above the top axial end of the ground layer;

a tap layer extension which is connected to the outside radial end of the tap layer and which is wrapped around the longitudinal conductor above the top axial end of the ground layer; and,

insulating members separating the tap and ground layers.

3,875,328

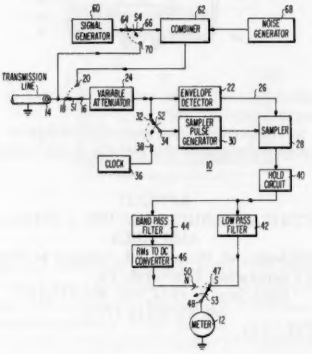
APPARATUS AND METHOD FOR MEASURING THE SIGNAL TO NOISE RATIO FOR A PERIODIC SIGNAL

John James Gibson, Princeton, and Hans George Schwarz, Pennington, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 3, 1973, Ser. No. 385,300

Int. Cl. H04b *1/00*

U.S. Cl. 178—6 **15 Claims**



1. An apparatus for measuring the signal to noise ratio of a periodic input signal, comprising:

cycle sampling means for sampling solely the same certain portion of each cycle of a sufficient number of cycles of said input signal to thereby provide as an output thereof a signal comprising a plurality of input signal samples whose average value manifests the average peak level of said input signal and whose standard deviation value manifests the magnitude of the noise in said input signal, means for deriving from said output signal applied as an input thereto a first D.C. signal having a value manifesting said average value and a second D.C. signal having a value manifesting said standard deviation value, and

means responsive to said first and second signals applied as respective inputs thereto for comparing the value of said first signal to the value of said second signal to thereby provide an output signal therefrom manifesting the signal to noise ratio of said input signal.

3,875,329

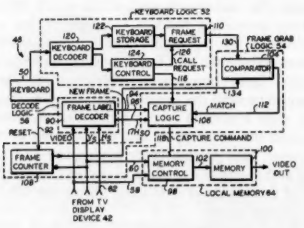
FRAME GRABBING SYSTEM

Robert H. Nagel, New York, N.Y., assignor to IDR, Inc., New York, N.Y.

Filed Jan. 17, 1974, Ser. No. 434,241

Int. Cl. H04n *7/18*

U.S. Cl. 178—6.8 **16 Claims**



1. A real time frame grabbing system for substantially instantaneously providing a continuous video display of a selectable predetermined video frame of information on a video display means from a plurality of different continuously transmittable frame of video information, each video frame containing associated horizontal and vertical sync signal information said system comprising means for retrievably storing said continuously transmitted frames; means operatively connected to said frame storage means for selectively encoding a predetermined horizontal scan line in a video frame after the vertical sync signal for said frame with a uniquely recognizable signal, said selective encoding means selectively encoding only a portion of said plurality of frames at a predetermined interval between encoded frames, said coding interval being dependent on at least a selected predetermined maximum access time for said video display of an individual selected predetermined video frame; means operatively connected to said frame encoding means and said frame storage means for providing said plurality of frames including said encoded plurality of video frames to said video display means; means operatively connected to said video display means for substantially instantaneously selecting a particular predetermined frame from said plurality of continuously transmitted frames; control means operatively connected between said frame selecting means and said video display means for controlling the provision of said continuously video displayable selected particular frame to said video display means for continuous video display thereof; said frame selection means comprising selectable input means operatively connected to said control means for providing a selection information output associated with said particular frame to said control means, said selection information output comprising a unique frame address for said particular frame; said control means comprising means operatively connected to receive said vertical sync information associated with said continuously transmitted frames, said vertical sync information comprising vertical sync pulse signals, said vertical sync information receiving means comprising means for sequentially counting said vertical sync pulses associated with said continuously transmitted frames to provide an output each of said outputs representing a unique frame address signal; comparator means operatively connected to said sequential counting means output and said selection information means output for comparing said frame address signal outputs, said comparator means providing an output signal when said selection information means frame address output and said sequential counting means output match; means operatively connected to receive said horizontal sync signal information and detect said uniquely recognizable signal, said detection means being further operatively connected to said counting means for resetting said counting means in response to said detection of said uniquely recognizable signal; and means operatively connected to said comparator means output for real time capturing said selected particular frame in response to said comparator output signal and providing said captured continuously video displayable selected particular frame to said video display means for continuous video display thereof.

3,875,330

DEVICE FOR CONTROLLING THE SCANNING IN AN INFRA-RED IMAGING SYSTEM

Jan Dahlqvist, Akersberga; Bo Matsson, Marsta, and Benny Johansson, Sollentuna, all of Sweden, assignors to AGA Aktiebolag, Lidingo, Sweden

Filed Mar. 5, 1974, Ser. No. 448,219

Claims priority, application Sweden, Mar. 6, 1973, 73030751

Int. Cl. 250 *334*; **H04n** *3/10, 5/06*

U.S. Cl. 178—7.1 **7 Claims**

1. A device for controlling the scanning in an infra- red imaging system comprising an IR-camera and an image representation unit, said IR-camera being provided with a first scanning part comprising a frame scanning unit rotated by means of an electric motor with a frame trigger unit and a second scanning part comprising a line scanning unit rotated by means of an electric motor with a line trigger unit, said

frame trigger unit and said line trigger unit each comprising a code disc provided with one or more channels, coupled mechanically to the respective frame and line scanning units each of said code discs rotating at the same speed as its associated scanning unit, said trigger units being adapted to generate signals frequency-dependent upon the pattern and rotational speed of the code discs and forming trigger signals for the

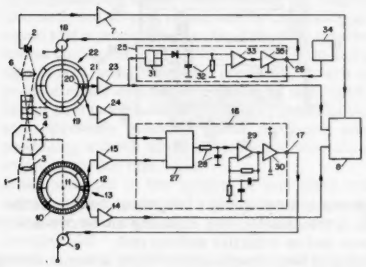


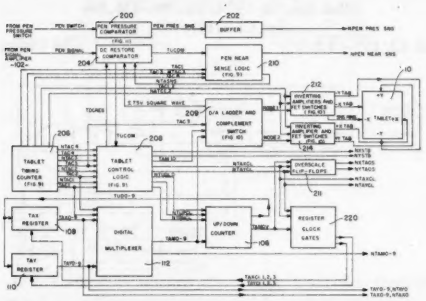
image representation unit, said signal from said respective trigger units being supplied to respective frame and line control systems, together with a reference signal for the control of the rotational speed of said scanning units, said reference signal being supplied to one of said control systems with the reference signal for the other of said control systems being generated by the trigger unit associated with the said one of said control systems.

3,875,331

VECTOR TABLET DIGITIZING SYSTEM

Ralph D. Hasenbalg, Canoga Park, Calif., assignor to Vector General, Inc., Canoga Park, Calif.

Filed Nov. 8, 1973, Ser. No. 413,773
Int. Cl. G08c *21/00*
U.S. Cl. 178—19 **10 Claims**



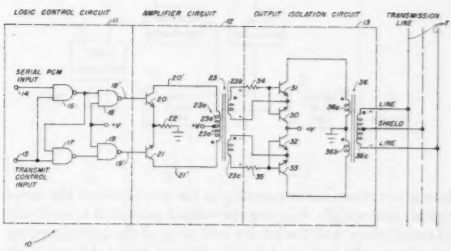
1. An electrostatic digitizing system comprising: an X-Y digital tablet providing a changing electrostatic field over a plane surface; a stylus movable over the plane surface of the tablet and capacitively coupled thereto for detecting the electrostatic field at predetermined X,Y coordinates; first circuitry including an X register and a Y register and connected to said tablet for producing exciting potentials therefor so as to create said field; and second circuitry coupled to said stylus and to said first circuitry and including a counter for controlling the digital contents of the registers in accordance with the position of the stylus on the tablet surface and for controlling said exciting potentials as a function of the position of the stylus on said surface.

3,875,332

DIGITAL TRANSMITTER FOR DATA BUS COMMUNICATIONS SYSTEM

James C. Fletcher, Administrator of the National Aeronautics and Space Administration with respect to an invention of, and George Eugene Proch, Houston, Tex.

Filed Dec. 27, 1973, Ser. No. 428,994
Int. Cl. H04l *5/16*
U.S. Cl. 178—58 A **8 Claims**



1. An improved digital transmitter having an isolating coupling circuit means for coupling the transmitter to a transmission line, said isolating coupling circuit means comprising:

a. first control means including electronic switching means responsive to a first control signal for providing either a low impedance or a high impedance pathway to said transmission line for a first output signal,

said first control means including a first transistor pair being emitter-connected together to provide said first output signal when said first control signal is supplied to the bases of said first transistor pair;

b. second control means including electronic switching means responsive to a second control signal for providing either a low impedance or a high impedance pathway to said transmission line for a second output signal,

said second control means including a second transmission pair being emitter-connected together to provide said second output signal when said second control signal is supplied to the bases of said second transistor pair and the collector of one of the transistors in said second transistor pair being connected to the collector of one of the transistors in said first transistor pair; and

c. means for holding said pathway in one of said control means at a high impedance when the pathway in the other of said control means is at a low impedance.

3,875,333

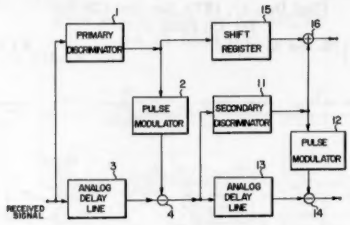
METHOD OF ELIMINATING ERRORS OF DISCRIMINATION DUE TO INTERSYMBOL INTERFERENCE AND A DEVICE FOR USING THE METHOD

Toshio Nakano, Kodaira, and Yasushi Kudo, Kamakura, both of Japan, assignors to Hitachi, Ltd. and Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Oct. 6, 1972, Ser. No. 295,654
Claims priority, application Japan, Oct. 8, 1971, 46-78648
Int. Cl. H04b *15/00*
U.S. Cl. 178—88 **15 Claims**

1. A method of eliminating error of discrimination due to intersymbol interference comprising steps of primarily discriminating an input signal to provide a discriminated pulse train, digitally delaying said discriminated pulse train by means of a shift register comprising at least two flip-flops, weighting an output or NOT output of each of said flip-flops, analogically adding said weighted signals to each other, analogically delaying said input signal, comparing the output produced in said step of analogical delay with the output produced in said step of analogical addition, secondarily discriminating the result of said comparison by reference to a

threshold value, generating a pulse corresponding to the result of said secondary discrimination, digitally half-adding said pulse to the output of said shift register, shaping said pulse corresponding to the result of said secondary discrimination

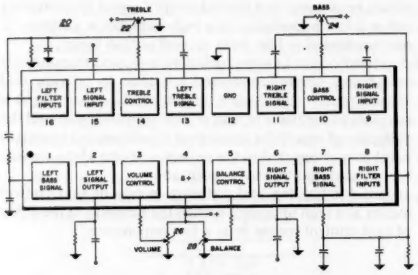


into a waveform corresponding to the waveform of the input signal, analogically delaying the output produced in said step of comparison, and comparing said pulse of the corresponding waveform with said analogically delayed signal derived from said signal produced in said step of comparison.

3,875,334
MULTI-CHANNEL CONTROL CIRCUIT WITH D-C OPERATED CONTROL DEVICES

Francis H. Hilbert, Addison, Ill., and Paul Dean Filliman, Fort Wayne, Ind., assignors to Motorola, Inc., Franklin Park, Ill.

Filed June 19, 1973, Ser. No. 371,437
Int. Cl. H04m *1/00*
U.S. Cl. 179—1 D **21 Claims**



1. A control circuit arrangement for effecting a plurality of predetermined control functions in a multi-channel system, comprising in combination:

means for providing at least one signal path including a signal current steering device having first and second outputs for supplying varying relative amounts of an input signal to such outputs in response to a variable control signal;

an output terminal;

means for receiving and amplifying a desired signal and selectively applying the same to said signal path and to said output terminal;

means for supplying a variable control signal to said current steering device;

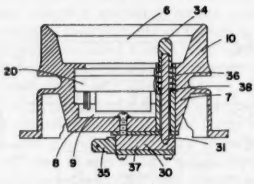
means coupling the first output of said steering device with said output terminal for feeding forward signals from said steering device for a boosting action; and

means coupling the second output of said steering device with said receiving and amplifying means in a feedback circuit for attenuating signals applied from said receiving and amplifying means to said output terminal.

3,875,335
PHONE COUPLER

John P. Kennedy, Columbus, Ohio, assignor to Design Elements, Inc., Columbus, Ohio

Filed Jan. 3, 1972, Ser. No. 214,882
Int. Cl. H04m *1/00*
U.S. Cl. 179—1 C **10 Claims**



1. Apparatus for coupling a telephone communication terminal to a transmission line including an electro-acoustical transducer and an inductive pick-up coil;

a housing of omnidirectionally movable structure having an upper portion circular opening adapted to receive said terminal, and a lower portion circular opening;

a casing for encapsulating said transducer and inductive pick-up coil, said casing having an outside size adapted to be retained with said lower portion circular opening; said casing having a pair of discontinuities to permit electro-acoustical communication with said terminal;

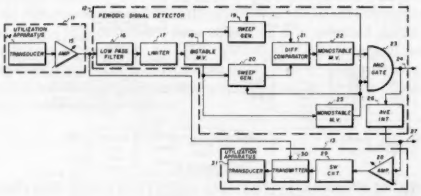
said casing including means for fixedly positioning said transducer and inductive pick-up coil therein; and

a switch for actuating said terminal fixedly positioned at a lowermost region of said housing and having contact means positioned in the uppermost portion of the housing.

3,875,336
PERIODIC SIGNAL DETECTOR

Walter W. Mullen, Jr., Lynn Haven, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 24, 1974, Ser. No. 436,306
Int. Cl. G10l *1/04*
U.S. Cl. 179—1.5 A **24 Claims**



1. A periodic signal detector, comprising in combination:

means for receiving a first signal of complex frequencies and for passing those frequencies thereof that are below a predetermined frequency as a second signal;

means connected to the output of said receiving and passing means for converting said second signal into a third signal having a substantially squarewave configuration that is corresponding thereto;

means having an input and a pair of outputs, with the input thereof connected to the output of said converting means for alternately producing a pair of oppositely polarized fourth and fifth signals at the outputs thereof in response to the squarewave configurations of said third signal, respectively;

means connected to one of the outputs of said oppositely polarized signal producing means for generating a predetermined increasing sixth signal in response to said fourth signal;

means connected to the other of the outputs of said polarized signals producing means for generating a predetermined increasing seventh signal in response to said fifth signal;

means connected to the outputs of said sixth and seventh signal producing means for comparing the magnitudes of said sixth and seventh signals and for producing an eighth signal that is proportional to the difference therebetween;

means connected to the outputs of said sixth and seventh signals comparing means for producing a ninth signal of predetermined duration in response to said eighth signal;

means connected to the other of the outputs of the aforesaid oppositely polarized signals producing means for producing a tenth signal of predetermined duration in response to said fifth signal;

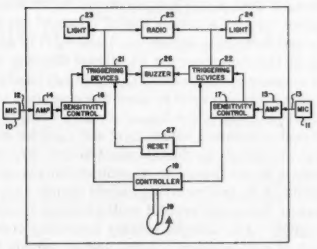
means connected to the outputs of said ninth and tenth signals producing means for producing an eleventh signal whenever said ninth and tenth signals occur simultaneously; and

means connected to the output of said tenth signal producing means for timely resetting the aforesaid sixth and seventh signals producing means in response to said tenth signal.

3,875,337
METHOD FOR MONITORING A CLASSROOM

Earl K. Bradley, 760 Van Kirk St., Clairton, Pa. 15025

Filed Mar. 15, 1974, Ser. No. 451,515
Int. Cl. G01v *1/00*
U.S. Cl. 179—1 VC **9 Claims**



1. A method to monitor the relative level of at least two sources of audible sounds produced by student members of a class, said method including the steps of:

arranging the student members of a class into a plurality of spatially-located groups,

generating a separate electrical signal proportional to the level of audible sounds produced by each of said groups of students,

separately amplifying each of said electrical signals,

biasing the separately-amplified electrical signals to provide a predetermined sensitivity signal level,

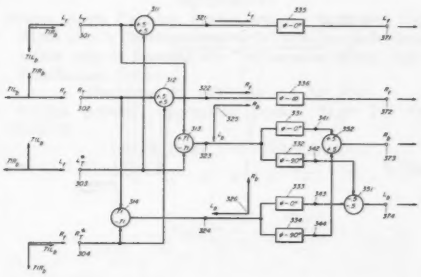
using the bias signals separately to control the flow of current in an electrical circuit including indicator means for each of said bias signals, and

inhibiting the operation of one of said indicator means when another of said indicator means is activated.

3,875,338
DECODER MATRIX FOR QUADRAPHONIC SOUND SYSTEMS

Benjamin B. Bauer, Stamford, Conn., assignor to Columbia Broadcasting System, Inc., New York, N.Y.

Filed Apr. 18, 1974, Ser. No. 462,043
Int. Cl. H04r *5/00*
U.S. Cl. 179—1 GQ **8 Claims**



1. Apparatus for decoding four individual audio signals to the extent they are contained in four encoded composite signals to recover the four individual audio signals in substantially their original form, a first of the composite signals containing the first individual audio signal in a dominant proportion and the third and fourth individual audio signals in subdominant proportions and phase shifted with respect to each other, a second of the composite signals containing the second individual audio signal in dominant proportion and the third and fourth audio signals in sub-dominant proportions and phase shifted with respect to each other, said third and fourth composite signals being respectively conjugates of said first and second composite signals, comprising:

a. first combining means which receives said first composite signal and said third composite signals and generates first and second processed signals which are a function of the sum and difference of said first and third composite signals;

b. second combining means which receives said second composite signal and said fourth composite signals and generates third and fourth processed signals which are a function of the sum and difference of said second and fourth composite signals;

c. a first all-pass phase shifting circuit for phase shifting said first processed signal to obtain a first decoded signal;

d. a second all-pass phase shifting circuit for phase shifting said second processed signal to obtain a second decoded signal;

e. a third all-pass phase shifting circuit for phase shifting said third processed signal by two different relative phase angles to obtain first and second auxiliary signals;

f. a fourth all-pass phase shifting circuit for phase shifting said fourth processed signal by two different relative phase angles to obtain third and fourth auxiliary signals;

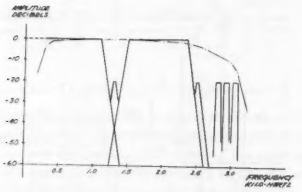
g. third means for combining said first and fourth auxiliary signals to obtain a third decoded signal; and

h. fourth means for combining said second and third auxiliary signals to obtain a fourth decoded signal.

3,875,339
VARIABLE BANDWIDTH VOICE AND DATA TELEPHONE COMMUNICATION SYSTEM

Harold Gruen, Merion; Philip S. Divita, Richboro, and Charles J. Werneth, Holland, all of Pa., assignors to I. I. Communications, Inc., Lionville, Pa.

Filed Sept. 5, 1972, Ser. No. 286,077
Int. Cl. H04j 1/14
U.S. Cl. 179—15 FD 11 Claims

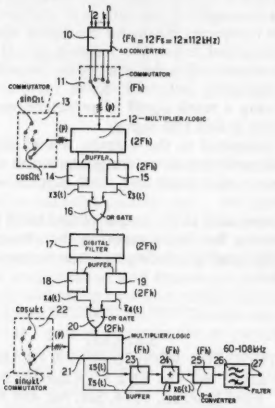


1. A telephone communication system comprising first and second telephone switchboards, means including standard telephone communication facilities interconnecting said first and second telephone switchboards and for temporarily allocating thereto a standard voice grade communication channel having an effective customer bandwidth of approximately 3000 Hertz, which channel may represent a single channel of a multi-channel carrier system, and means including switching means for facilitating the transmission of two separate voice grade communications of abbreviated bandwidth plus dial signals between plural telephones connected to said first and second telephone switchboards, said last-named means including first transmitting means for transmitting a first communication comprising voice grade signals at a first unique band of frequencies within said effective customer bandwidth and for modulating and transmitting at a unique band of frequencies within said effective customer bandwidth a first set of dial signals, both said voice grade signals and said dial signals being generated in a first telephone connected to one of said telephone switchboards, second transmitting means for modulating and transmitting a second communication comprising voice grade signals at a third unique band of frequencies within said effective customer bandwidth and for modulating and transmitting at a fourth unique band of frequencies within said effective customer bandwidth a second set of dial signals, both said second voice grade signals and said second set of dial signals being generated in a second telephone connected to one or another of said telephone switchboards, first receive means for receiving the unique band of voice grade signals transmitted by said first transmitting means, said first means further comprising a demodulator for demodulating the dial signals associated with said voice grade communication transmitted by said first transmitting means and for inputting the demodulated dial signals to the other one of said first and second telephone switchboards, said first receive means further comprising means for interpreting said dial signals and for generating a signal in response thereto to activate the ringer of a third telephone connected to the other one of said telephone switchboards, and second receive means including means for demodulating the said unique band of voice grade frequencies generated in said second transmitting means and the dial signals associated therewith and transferring said demodulated voice and dial signals to the other one of said one or another telephone switchboards for use in activating the ringer of a fourth telephone.

3,875,340
DIGITAL SYSTEM FORMING A FREQUENCY MULTIPLEX SYSTEM

Marie-Annick Roy, Antony; Alain Cabet, and Patrice Desombre, both of Paris, all of France, assignors to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed July 3, 1973, Ser. No. 376,169
Claims priority, application France, July 3, 1972, 72.24032
Int. Cl. H04j 1/04
U.S. Cl. 179—15 FD 9 Claims



1. A digital system for forming a frequency multiplex group from n incoming channels, operated at a sampling frequency Fs, comprising analog-digital conversion means receiving said n incoming channels and furnishing digital values $x_2(t)$ at the output thereof, first multiplication means for multiplying said digital values $x_2(t)$ by alternate digital values of $\cos 2\pi F_1 t$ and $\sin 2\pi F_1 t$ and furnishing signals $x_3(t)$ and $x_3(t)$ in quadrature, operating at the frequency $2n$ Fs, digital filtering means for receiving in common said values $x_3(t)$ and $x_3(t)$ and furnishing digital values $x_4(t)$ and $x_4(t)$ in quadrature, second multiplication means operating at the frequency **2n** Fs and receiving in common said quadrature values $x_4(t)$ and $x_4(t)$ for multiplying said values alternately by digital values of $\cos 2\pi f_k t$ and $\sin 2\pi f_k t$, wherein k varies from 1 to n, addition means operating at the frequency n Fs and receiving output signals $x_5(t)$ and $x_5(t)$ in quadrature from said second multiplication means for furnishing signals $x_6(t)$, a digital-analog converter connected to the output of said addition means, and an analog band-pass filter having a bandwidth of 60 – 108 kHz connected to the output of said digital-analog converter.

3,875,341
SYSTEM FOR TRANSFERRING WIDEBAND SOUND SIGNALS

Gerhard Gunter Gassmann, Berkheim, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Feb. 22, 1973, Ser. No. 334,525
Claims priority, application Germany, Feb. 24, 1972, 2208805; Apr. 14, 1972, 2218154; Oct. 12, 1972, 2250094
Int. Cl. H04b 1/66
U.S. Cl. 179—15.55 R 30 Claims

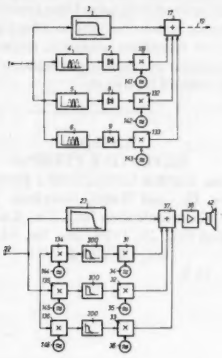
1. A transmitter for transferring wideband sound signals over a narrow frequency range, comprising:

means for receiving the sound signals;

means for dividing the received sound signals into a lower frequency range and a plurality of higher frequency ranges;

means for providing amplitude signals corresponding to the amplitudes of the signals in each of the higher frequency ranges;

means for providing a pilot frequency signal;



means for sequentially modulating the pilot frequency signal with the amplitude signals of the higher frequency ranges; and

means for transferring the signals of the lower frequency range and the sequentially modulated pilot frequency signal.

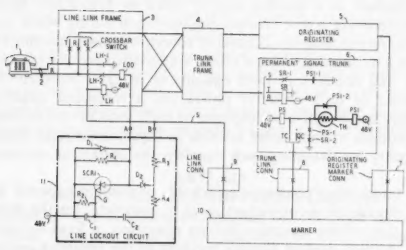
3,875,342
PERMANENT SIGNAL LOCKOUT CIRCUIT FOR CROSSBAR SWITCHING SYSTEMS

Mark Charles Stern, New York, N.Y., assignor to American Telephone and Telegraph Company and Western Electric Company, both of New York, N.Y.

Filed Nov. 5, 1973, Ser. No. 412,635

Int. Cl. H04m *3/12*

U.S. Cl. 179—18 F **9 Claims**



1. A permanent signal lockout arrangement for a crossbar switching system having a line relay for monitoring the switchhook status of a telephone line to initiate service requests and a hold magnet including contacts for disconnecting said line relay from said telephone line during the setup of switching connections, said lockout arrangement comprising,

blocking means in series with said line relay, said blocking means triggerable to complete an operating path for said line relay,

coupling means responsive to an on-hook to off-hook transition appearing on said telephone line at said line relay for triggering said blocking means to allow said line relay to operate responsive to an off-hook signal on said telephone line at said line relay, said switching system subsequently operating said hold magnet to disconnect said line relay and to release said blocking means,

means for releasing said switching connections and said hold magnet upon detection of a permanent signal condition on said telephone line, and

means for preventing said coupling means from retriggering said blocking means in response to the apparent on-hook to off-hook transition at said line relay which results when said hold magnet releases and reconnects said line relay to said telephone line having said permanent signal condition, whereby said line relay remains released for the duration of said permanent signal condition.

3,875,343
AUTOMATIC DEVICE FOR TESTING TELEPHONE EQUIPMENT

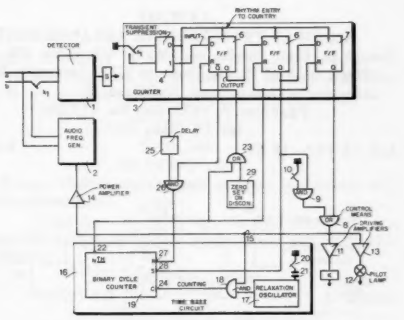
Joseph Quere, Lannion, France, assignor to Socotel Societe Mixte pour le Developpement de la Technique de la Commutation dans le Domaine des Telecommunications, Issy-les-Moulineaux, France

Filed Mar. 19, 1973, Ser. No. 342,839

Claims priority, application France, Mar. 21, 1972, 72.10578

Int. Cl. H04b *3/46;* **H04m** *3/22*

U.S. Cl. 179—175.3 R **8 Claims**



1. An automatic telephone line test device comprising detector means for detecting intervals of telephone ringing current appearing on said line, generating means for generating signals at audio frequency, first relay means connected to have one position to connect the detector means to a telephone line and another position to connect the generator means to said telephone line, multi-stage ringing interval counter means for counting a predetermined number of ringing current intervals as they are received over said line and detected by the detector means, timing circuit means operating during a predetermined interval of time and resetting said ringing interval counter means to an initial state at the end of said time interval, control means actuated by an output of said ringing interval counter means to switch said electromagnetic relay to said other position to trigger the operation of the said timing circuit means.

3,875,344
DIGITAL DATA COMPRESSION METHOD AND SYSTEM

Robert W. Bogart, Ellicott City, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 15, 1973, Ser. No. 341,644

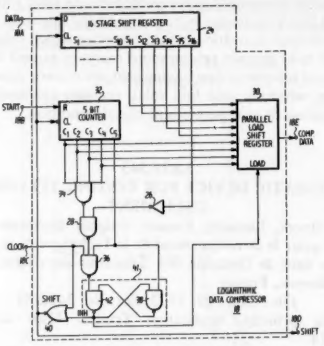
Int. Cl. H03r *13/24*

U.S. Cl. 179—15.55 T **10 Claims**

6. The system of claim 5 wherein said digital data signal entering means comprises:

means for serially shifting the bits of the digital data signal into said shift register; and,

means for counting the number of bits of the digital data signal shifted into said shift register and for indicating the



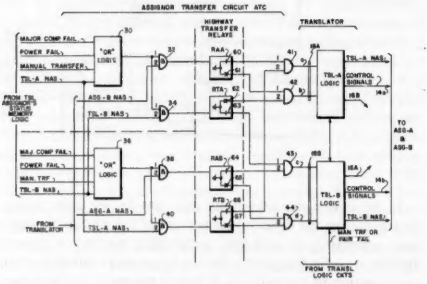
entry of all of the bits of the digital data signal into said shift register.

3,875,345

HIGHWAY TRANSFERRING ARRANGEMENT

Donald H. Brei, Roselle, and Walter Gloeckler, Elk Grove Village, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Nov. 5, 1973, Ser. No. 413,096
Int. Cl. H04q *3/47*
U.S. Cl. 179—18 ET **9 Claims**



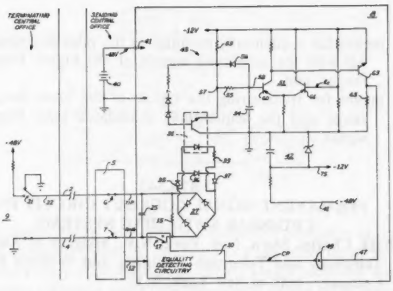
1. In a communication switching system including a plurality of incoming trunks, a plurality of register-senders, a switching network for connecting any one of said incoming trunks with any one of said register-senders, a pair of translators, a translator assignor associated with each of said translators, each of said translators and its associated translator assignor normally being on line serving a predetermined number of said plurality of register-senders and being connected thereto by means of a data highway and an access control highway, respectively, the improvement comprising a highway transferring arrangement for keeping said system operational in the event one of said translators or one of said translator assignors goes off line, said arrangement comprising a relay transfer circuit associated with each of said access control highways and each of said data highways and operable to disconnect an access control highway from a translator assignor to which said access control highway normally is connected and connect said access control highway to the opposite translator assignor and to disconnect a data highway from a translator with which said data highway normally is connected and connect said data highway to the opposite translator, and control means comprising gating means operated responsive to signals indicating the on line or off line condition of the respective ones of said translators and translator assignors for operating the associated ones of said relay transfer circuits to couple the access control highway associated with a translator assignor which goes off line to the other one thereof and the data highway associated with a translator which goes off line to the other one thereof, whereby a data highway or an access control highway associated with an off line translator or an off line translator assignor is switched and connected to the other on line translator or translator assignor, respectively, and said one on line translator or translator assignor serves both of said data or access control highways.

3,875,346

REVERTIVE PULSING

Orrin B. O'Dea, Garden Grove, Calif.; Philip Johnson, Hoffman Estates, Ill., and Ralph Morrison, Pasadena, Calif., assignors to Communication Mfg. Co., Long Beach, Calif.

Filed Feb. 25, 1974, Ser. No. 445,648
Int. Cl. H04m *7/12*
U.S. Cl. 179—18 E **6 Claims**



1. In an arrangement for monitoring tip and ring telephone conductors in a sending central office to detect and signal completion of a revertive pulsing operation during which one or more successively occurring revertive pulses transmitted from a terminating central office are serially carried by the tip and ring conductors until equality is reached between the number of such revertive pulses and a registered number, apparatus operative in response to each such revertive pulse to produce a clock pulse suitable to trigger solid state digital circuitry for detecting such equality, the apparatus comprising:

a terminating resistance switchably connected between the tip and ring conductors so as to complete, for the duration of the revertive pulsing operation, a loop for conducting current flowing incident to the revertive pulses; a diode bridge circuit having a pair of input nodes each being connected to an opposite end of the terminating resistance and a pair of output nodes between which unidirectional current can flow irrespective of the direction of the loop current;

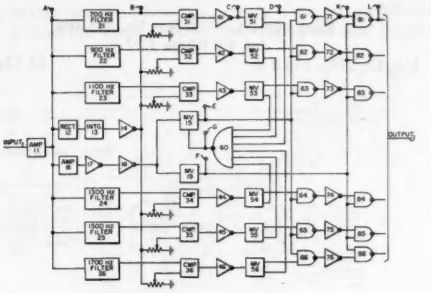
an optical-coupler device comprising an optical-coupler diode and an electrically isolated optical-coupler transistor, the optical-coupler diode being connected in series-circuit relationship between the pair of output nodes so that the revertive pulses cause pulses of unidirectional current to flow through the optical-coupler diode, and the optical-coupler transistor switching from a non-conductive condition to a conductive condition and back in response to each such pulse of current; and

a pulse shaping circuit responsive to the cyclical switching of the optical-coupler transistor so as to produce a clock pulse per revertive pulse.

3,875,347
MULTIFREQUENCY SIGNAL RECEIVER

Jamil K. Alaily, La Grange, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Oct. 1, 1973, Ser. No. 402,517
Int. Cl. H04m *1/00*
U.S. Cl. 179—84 VF **7 Claims**



1. A receiver for detection of multifrequency tone signals comprising: a plurality of comparator circuits; a plurality of tone responsive circuits, each connected between a common source of multifrequency tone signals and a different one of said comparator circuits and each operated in response to receipt of a different single frequency tone signal, to couple said received signal to said connected comparator circuit; rectifier means connected between said source of multifrequency tone signals and each of said comparator circuits, operated in response to said multifrequency tone signals to couple a direct current potential corresponding in amplitude to the amplitude of said multifrequency tone signals to each of said comparator circuits; whereby said comparator circuit in response to a single frequency tone signal and DC potential from said rectifier means, generates an output signal of fixed delay; output means connected to the output of each of said comparator circuits, comprising:

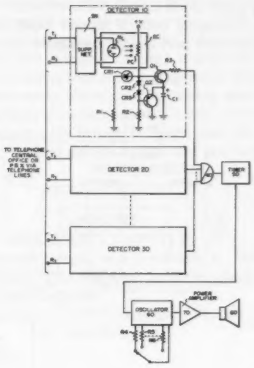
a first trigger circuit connected to said source of multifrequency tone signals, said trigger circuit operated in response to a multifrequency tone signal to generate a trigger pulse of predetermined duration; a first plurality of gate circuits each connected to a different one of said comparator circuits and each connected to said first trigger circuit, each of said gate circuits operated in response to coincidence of an output signal from said connected comparator circuit and said first trigger pulse to generate an output signal of fixed duration.

3,875,348
COMMON AUDIBLE SIGNALING CIRCUIT

Thomas J. Kopec, Arlington Heights, and Richard A. Morstadt, Elmhurst, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Oct. 23, 1973, Ser. No. 408,762
Int. Cl. H04m *1/00*
U.S. Cl. 179—84 R **6 Claims**

1. Common audible signaling means for indicating the presence of incoming ringing signals on at least one of a plurality of associated communication lines, said means comprising: a plurality of detectors each including, a light emitting source connected to a different one of said communication lines and operated in response to the presence of ringing signals on said connected line, switching means, and voltage divider means connected across a voltage source including a circuit connection to said switching means and a two legs, one of said legs including fixed resistive elements and the other of said legs including light sensitive element operated in response to light from said light emitting source, and a center tap connected to the input of said switching means; a source of audible signals; gating means connected between said audible signal source and to the output of each of said detector switching means, operated in response to operation of at least one of said switching means to operate said signal source; and a signal

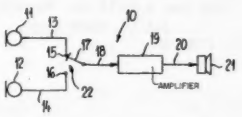


transducer connected to said signal source operated in response to said operated signal source to audibly reproduce signals from said source.

3,875,349
HEARING AID

Heinz Ruegg, Thalwil, Switzerland, assignor to Bommer AG, Zurich, Switzerland

Filed Jan. 24, 1973, Ser. No. 326,550
Claims priority, application Switzerland, Feb. 2, 1972, 1547/72
Int. Cl. H04p *25/00*
U.S. Cl. 179—107 FD **12 Claims**



1. An individual hearing aid for wearing by the hard of hearing, the hearing aid being transportable by the wearer and comprising amplifier means, a microphone system electrically coupled with said amplifier means, said microphone system comprising a first microphone having approximately spherical sensitivity chatacteristics and a second microphone with directed sensitivity characteristics, and means for selectively connecting the amplifier means with one or the other of both microphones.

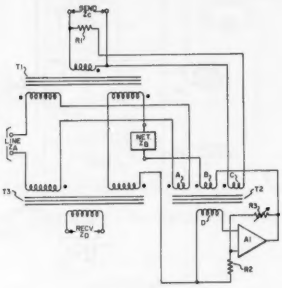
3,875,350
SELF-BALANCING HYBRID CIRCUIT

Russell C. Fischer, Wheaton, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Nov. 5, 1973, Ser. No. 402,564
Int. Cl. H04b *1/52*
U.S. Cl. 179—170 D **3 Claims**

1. A self balancing hybrid circuit comprising: a hybrid transformer including a plurality of windings; a first conjugate pair of ports comprising a first port connectible to a two-way transmission line and to a first pair of said transformer wind-

ings and a second port connectible to a balancing network and to a second pair of said hybrid transformer windings, a second pair of conjugate ports comprising a first port connectible to a send channel and to a third winding of said hybrid transformer and a second port connectible to a receive channel and to a fourth winding of said hybrid transformer; sensing means including a first input circuit connection from said first port of said first conjugate pair, a second input circuit connection from said second port of said conjugate pair and a third input

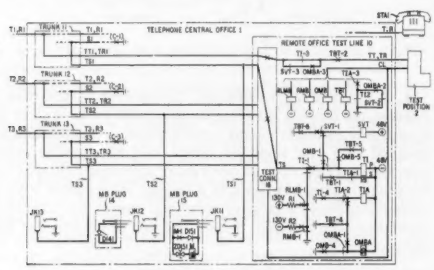


circuit connection from said port of said second conjugate pair connected to said send channel; whereby in response to detection of an unbalanced electrical relationship between signals at said first conjugate pair of ports resulting in electrical signals in said send channel port, said sensing means are operated to insert a compensating signal into said second port of said first conjugate pair to correct error signals resulting from electrical unbalance between said first and second ports of said first conjugate pair.

3,875,351
TRUNK BUSY TEST CIRCUIT

James Blakely Kennedy, Bexley, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Jan. 9, 1974, Ser. No. 432,083
Int. Cl. H04b *3/46*
U.S. Cl. 179—175.3 R **11 Claims**



1. A test circuit for enabling a test position to conduct operational tests on telephone central office trunks arranged to establish subscriber calls between telephone stations comprising

means responsive to signals generated by the test position for selecting ones of the trunks,

means enabled by the test position for identifying idle and busy ones of the selected trunks,

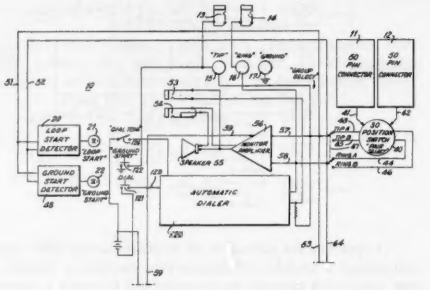
means for distinguishing between ones of the busy trunks handling subscriber calls and ones of the busy trunks made trouble busy, and

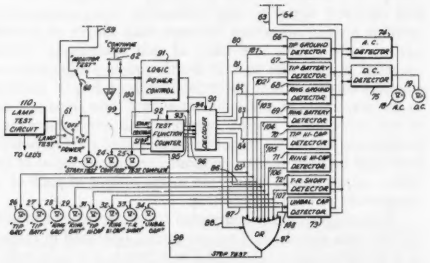
means for connecting both the selected idle and trouble made-busy trunks with the test position.

3,875,352
CABLE PAIR TEST APPARATUS

Ronald G. Caravello, Massapequa, N.Y., and John Mickowski, Maplewood, N.J., assignors to Porta Systems Corp., Syosset, N.Y.

Filed Aug. 31, 1973, Ser. No. 393,408
Int. Cl. H04m *3/22*
U.S. Cl. 179—175.2 R **15 Claims**





1. A cable fault detector with integrated means for verifying the status of lines as well as determining the type of line being selected for test comprising means for associating a plurality of communication pairs with said detector including means for selecting individual ones of said pairs for test; means under control of said selecting means for testing the individual pairs to determine the type of line under test; indicators energized by said testing means to indicate a ground start line, spare line, and a loop start line; and means under control of said selecting means in cooperation with a manual start signal to run a sequence of line fault checks which establish the working status of said individual line.

3,875,353
MULTISTAGE SWITCH ASSEMBLY HAVING RADIAL CONTACTS AXIALLY BRIDGING SUCCESSIVE PRINTED CIRCUIT BOARD CONTACTS

Labib Mardach, Nuremberg, Germany, assignor to Franz Sieradzki, Nuremberg, Germany

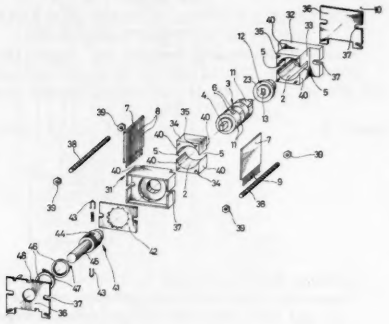
Filed Dec. 26, 1973, Ser. No. 428,095
Claims priority, application Germany, Jan. 17, 1973, 2302048
Int. Cl. H01h *19/56*
U.S. Cl. 200—8 A **14 Claims**

1. A multistage switch comprising, in combination:

a. a housing made up of a plurality of sections;

b. two end pieces of said housing;

c. a substantially cylindrical rotor rotatable withing said housing about an axis;
d. said sections defining at least one longitudinal slot in the housing substantially parallel to said axis;
e. a plurality of axially successive individual elements forming said rotor;
f. at least one radially protruding contact on each of said successive individual elements forming said rotor;
g. at least one removable intermediate piece, provided with at least one longitudinal slot for varying the axial length

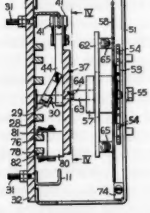


of said housing, the axial length of each said intermediate piece corresponding to an integral multiple of the axial length of said individual element;
h. at least one contact plate, transverse to the axis of the rotor and tagential to the rotor, arranged to overlie the longitudinal slot in the housing; and
i. tangential contact strips carried by said contact plate and selectively making electrical contact with said radially protruding contact of said rotor the axial length of said contacts being such as to connect at least two axially successive contact strips of a contact plate.

3,875,354
LOAD TAP CHANGING MECHANISM HAVING CONSTANT DUTY CYCLE

Harold C. Dusek, Menomonee Falls, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Feb. 26, 1974, Ser. No. 445,907
Int. Cl. H01h *19/54*
U.S. Cl. 200—11 TC **8 Claims**



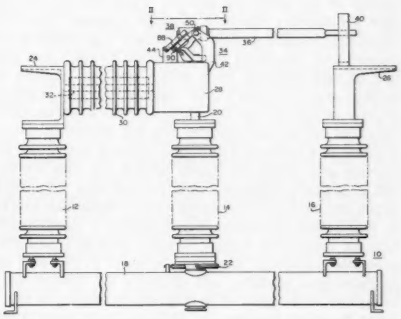
1. In combination with a tap changing selector switch having a plurality of stationary contacts arranged in a circle adapted to be electrically connected to taps of a tapped electrical winding, a pair of movable contacts, and a carrier for said movable contacts rotatable about an axis through the center of said circle to sequentially engage said movable contacts with said stationary contacts;

a reversing switch including a stationary conductive slip ring concentric with said circle and adapted to be connected to an electrical power source, first and second stationary conductive arcuate contacts adapted to be electrically connected to opposite ends of said winding and disposed in circumferentially spaced relation concentric with said selector switch stationary contact circle and said slip ring, and a conductive bridging contact transported by said carrier in continuous electrical engagement with said slip ring and alternately electrically engaging said first and second stationary arcuate contacts as said carrier rotates to thereby alternately bridge between said slip ring and said first and second stationary arcuate contacts.

3,875,355
DISCONNECT SWITCH

Russell E. Frink, Pittsburgh, and Stanislaw A. Milianowicz, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 11, 1973, Ser. No. 396,163
Int. Cl. H01h *31/00*
U.S. Cl. 200—48 A **8 Claims**

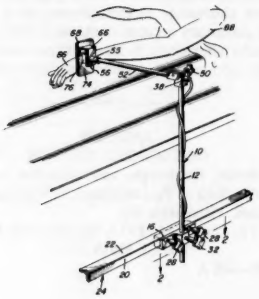


1. A disconnect switch comprising a pair of stationary contacts at spaced locations, a switch blade pivotally movable between open and closed positions with one of the stationary contacts, means for pivotally mounting the switch blade at a location spaced from one of the stationary contacts and comprising a stationary frame, the other stationary contact being electrically connected to the stationary frame, the stationary frame supporting a movable sleeve in which the blade is rotatably mounted, rotating means rotating the blade in the sleeve when the blade is pivotally moved between the open and closed positions, the rotating means comprising a rotatable sleeve in which the switch blade is disposed and which is rotatably mounted in the movable sleeve, a clamping sleeve within the switch blade for holding the switch blade in tight electrical contact with the rotatable sleeve, the outer surface of the rotatable sleeve having an oval cross-section, and conductor means mounted on the stationary frame and positioned externally of the clamping sleeve for engagement and disengagement with said oval cross-section of the rotatable sleeve when the blade is in the closed and open positions, respectively.

3,875,356
CALL SWITCH BRACKET FOR HANDICAPPED

John V. Heim, 5 Della St., Lecanto, Fla. 32661, and Kenneth R. Heim, 9508 W. 56th Pl., Arvada, Colo. 80002

Filed Aug. 24, 1973, Ser. No. 391,057
Int. Cl. H01h *3/16*
U.S. Cl. 200—52 R **6 Claims**



1. In combination, an upright standard, means removably carried by the lower end portion of said standard for support from a stationary structure adjacent a support upon which a physically disabled person is disposed, a generally horizontal support arm, mounting means carried by the upper end portion of said standard from which one end portion of said support arm is supported for adjusted longitudinally shifted position relative to said standard, a switch structure carried by the other end of said support arm and including an operator shiftable in a horizontal direction between active and inactive position and yieldingly biased toward the inactive position, and a vertically elongated operator actuator supported at its upper end portion for swinging about a horizontal axis relative to said switch structure and including a substantially free hanging lower end portion thereof pivotably shiftable in a generally horizontal direction between active and inactive positions and abutting said operator for shifting the latter toward its active position in response to shifting of said actuator to its active position and shiftable to its inoperative position in response to movement of said operator to its inactive position.

3,875,357
SEWAGE DISPOSAL SYSTEM

Edward P. Foster, Hartville; Robert J. Kelly, Wadsworth, and Warnie L. Sage, Louisville, all of Ohio, assignors to The Babcock & Wilcox Company, New York, N.Y.

Continuation-in-part of Ser. No. 172,384, Aug. 17, 1971, abandoned. This application Nov. 1, 1973, Ser. No. 411,854
Int. Cl. C02c *3/00*
U.S. Cl. 210—59 **14 Claims**

6. A method for sewage disposal including a liquid fuel fired steam generator, wall means including steam generating tubes and defining a furnace and passageway means in gas flow receiving communication with the furnace, and comprising the steps of:

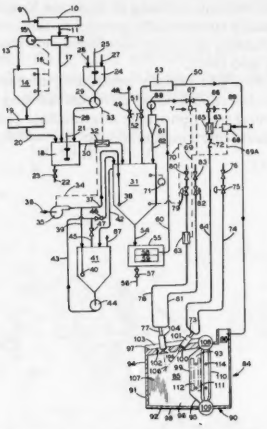
firing liquid fuel within said furnace to maintain a high temperature combustion zone therein for the generation of steam through indirect heat exchange,

continuously metering the fuel input to said furnace,

injecting a pressurized liquid-solids sewage mixture into said combustion zone only when the fuel input exceeds a predetermined level,

steam atomizing the sewage mixture prior to injection into said combustion zone,

continuously metering the sewage input to said combustion zone, and

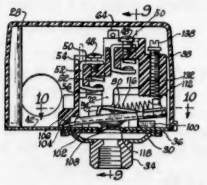


regulating the sewage input to maintain a sewage to fuel input ratio resulting in substantially complete vaporization and incineration of the liquid-solids sewage mixture within said furnace.

3,875,358
DIAPHRAGM SNAP PRESSURE SWITCH

Dale F. Willcox, Aurora, Ill., assignor to Furnas Electric Company, Batavia, Ill.

Filed Feb. 19, 1974, Ser. No. 443,445
Int. Cl. H01h *35/34*
U.S. Cl. 200—83 P **19 Claims**



1. A pressure controlled switch comprising a molded support having an upper surface and a lower surface with spaced side walls extending therebetween to form an interior space, a pair of terminals mounted on said upper surface, a pair of stationary contacts having each one a first portion electrically and mechanically connected to each terminal, a pair of spaced passages opening in said upper surface and extending to said interior space, each stationary contact having a second portion extending through one of said spaced passages into said interior space and having a third portion extending into said interior space at an angle to said second portion, guide slots formed in said side walls of said support between said stationary contacts and opening into said interior space thereof, a contact carrier having edges slidable in said guide slots whereby said contact carrier may move within said interior space, a movable contact mounted on said contact carrier and extending perpendicular thereto to overlay said stationary contacts to engage and disengage from the same upon movement of said contact carrier, a flipper pivotally mounted in said side walls and engageable with said contact carrier, a first lever pivotally mounted under said flipper and having an arm extending upwardly therefrom, a main spring mounted in said support and bearing on the free end of said lever to urge said free end in a first direction, a snap spring connected between

said arm and said flipper normally biasing said flipper toward said first lever, a diaphragm having one surface in engagement with said lever, and a diaphragm housing covering the other surface of said diaphragm and having an opening where fluid from a source may be connected to said diaphragm having to cause said diaphragm to urge said lever in a second direction against the force of said main spring thereby causing said flipper to rotate about its pivot moving said contact carrier and said movable contacts.

3,875,359

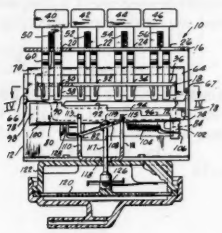
DIAPHRAGM PRESSURE SWITCH ADJUSTING MECHANISM FOR PUSH BUTTONS

William H. Backus, 363 Galahad, Bolingbrook, Ill. 60439

Continuation-in-part of Ser. No. 222,881, Feb. 2, 1972, abandoned. This application July 11, 1973, Ser. No. 378,372

Int. Cl. H01h *35/34*

U.S. Cl. 200—83 S **5 Claims**



1. A push button mechanism for adjusting the pressure required to trip a switch in response to movement of a pressure diaphragm, said push botton mechanism comprising:

a. a main bracket assembly including a base and at least one support guide substantially parallel to said base, said support guide defining a plurality of openings;

b. a plurality of push button shaft means, each of said shaft means extending through one of said plurality of openings and having a normal, raised position and a depressed position;

c. a locking member pivotably mounted about a longitudinal axis and removably engaging each of said plurality of push button shaft means when each is in said depressed position and holding each in said depressed position and releasing the remainder of said plurality of push button shaft means, allowing each to return to said raised position;

d. a lever member having an end thereof pivotally mounted with respect to said main bracket assembly and defining a plurality of stepped areas, each of said stepped areas contacting a corresponding one of said plurality of push button shaft means when said one of said shaft means is in said depressed position;

e. pressure contact means operably connected to the pressure diaphragm;

f. biasing means operably connected to said pressure contact means and said lever member at an end of said lever member oppositely disposed from said pivotally mounted end to exert a biasing force on the pressure diaphragm, said biasing means being subjected to a preload, said preload being determined by the relative position of said lever member to said main bracket assembly, said lever member assuming a different relative position when each of said plurality of stepped areas is contacted by said corresponding push button shaft means in its depressed position; and

g. said lever member including means for mounting one end of said biasing means thereto, said mounting means comprising a plurality of connection points providing a coarse adjustment of said preload.

3,875,360

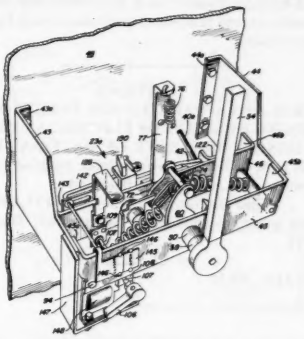
STORED-ENERGY OPERATING MECHANISM FOR SWITCH BLADES

Tadeusz J. Rys, Monroe, Ohio, assignor to Square D. Co., Park Ridge, Ill.

Continuation of Ser. No. 329,804, Feb. 5, 1973, abandoned. This application Feb. 25, 1974, Ser. No. 445,735

Int. Cl. H01h *3/30, 9/22, 31/06*

U.S. Cl. 200—153 SC **9 Claims**



1. An operating mechanism for opening and closing an electrical switch comprising a supporting frame, a spring-actuated switch-closing means movably mounted on said frame; a spring-actuated switch-opening means movably mounted on said frame; manually-actuated means mounted on said frame for moving both of said spring-actuated means to a charged position; adjustable first means mounted on said frame for releasing said switch-closing means from said charged position and effecting movement thereof in a predetermined direction to a discharged position closing the switch only while said switch-opening means remains in a charged position; adjustable second means mounted on said frame for releasing said switch-opening means from said charged position and effecting movement thereof in a predetermined direction to a discharged position opening the switch; and connecting means for transmitting the movement of both of said spring means to the switch to effect closing and opening thereof.

3,875,361

MICROWAVE HEATING APPARATUS HAVING AUTOMATIC HEATING PERIOD CONTROL

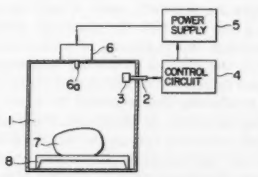
Yukio Fukui, and Mitsuru Watanabe, both of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed June 13, 1973, Ser. No. 369,428

Claims priority, application Japan, June 16, 1972, 47-59478; Mar. 16, 1973, 48-30068

Int. Cl. H05b *9/06*

U.S. Cl. 219—10.55 B **10 Claims**



1. A microwave heating apparatus of the type heating an object in a heating chamber by microwaves, said apparatus comprising:

detection means for detecting temperature in the heating chamber, said detection means including a microwave energy-absorbing member disposed in said heating chamber for absorbing a portion of said microwaves, and a detector for detecting a temperature of said microwave energy-absorbing member, said temperature of said microwave energy-absorbing member changing dependent on the quantity of said object, thereby detecting a temperature of said object to be heated, and

control means for controlling the supply of microwaves to said heating chamber as a function of the detection of a predetermined temperature of said object by said detection means.

3,875,362

PROCESS AND APPARATUS FOR ELECTRO-EROSION MACHINING BY MEANS OF ELECTRICAL DISCHARGES PROVIDING A HIGH RATE OF MATERIAL REMOVAL

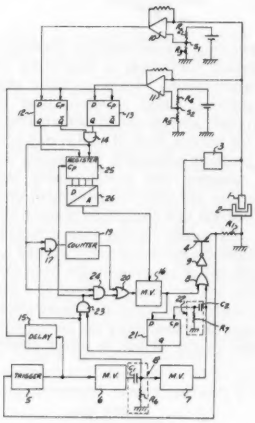
Francois Balleys, Vernier, Switzerland, assignor to Ateliers des Charmilles S.A., Geneve, Switzerland

Filed Dec. 26, 1973, Ser. No. 427,489

Claims priority, application Switzerland, Dec. 29, 1972, 19064/72

Int. Cl. B23p *1/08*

U.S. Cl. 219—69 M **51 Claims**



49. In a process for machining a workpiece by means of intermittent electrical discharges provided by controlled current pulses whereby consecutive trains of consecutive voltage pulses are applied across a machining gap between said workpiece and an electrode tool by switching on and off across said gap at least one source of direct current such that said source is switched off during pulse cut-off time intervals between two consecutive voltage pulses and during pulse train cut-off intervals between consecutive pulse trains, and wherein characteristic discharges are detected, each of said characteristic discharges being one for which the discharge voltage amplitude measured between the beginning of a current pulse and the time at which the current is cut off is comprised between predetermined values, the higher of said values corresponding to a normal machining discharge and the lower of said values corresponding to arcing or short circuit across the gap, the improvement comprising varying the length of the cut-off time interval between consecutive pulses within a single pulse train after detection of a predetermined number of successive characteristic discharges as a function of the difference between the total number of pulses within the pulse train and a reference number for maintaining said number of characteristic discharges within predetermined limits.

3,875,363

COMPOSITE ELECTRODE WIRE FOR ELECTRO-SLAG WELDING

Masayasu Arikawa, Fujisawa; Toshihiko Watanabe, Kamakura, and Motomi Kano, Fujisawa, all of Japan, assignors to Kobe Steel, Ltd., Fukiai-ku, Kobe, Japan

Division of Ser. No. 235,860, March 17, 1972, abandoned.

This application May 14, 1973, Ser. No. 359,662

Claims priority, application Japan, Mar. 29, 1971, 46-18642

Int. Cl. B23k *25/00*

U.S. Cl. 219—73 **8 Claims**

1. In an electro-slag welding process, the improvement comprising:

using a composite electrode wire comprising a steel casing and a powdered composition fill within said casing, said composite electrode wire consisting essentially of up to 0.25% carbon. 0.3 to 2.5% manganese, up to 1% silicon, 0.001 – 0.05% boron with respect to the total weight of said composite electrode wire and the balance iron, the boron content being present within said casing, in powdered form, as a boron alloy containing up to 50% boron.

3,875,364

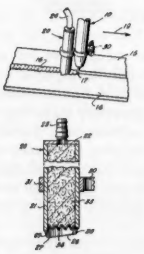
APPARATUS FOR INERT GAS SHIELDED WELDING

Dallas T. Boyett, 2321 Colony Ct., Dallas, Tex. 75235

Filed Apr. 23, 1973, Ser. No. 353,337

Int. Cl. B23k *9/16*

U.S. Cl. 219—74 **14 Claims**



1. A gas flooding device for attachment to a welding tool tip comprising

a housing defining an enclosure having one open wall, a leading side wall, and a trailing side wall; clamp means extending forwardly of the leading side wall of said housing for attaching said housing in tandem relation with a welding tool tip, with said leading side wall disposed adjacent to said welding tip and with said open wall disposed to confront the work;

said device having gas inlet means for said enclosure, disposed in spaced relation to said open wall; gas diffusion means defined by a porous partition disposed in said enclosure, separating said gas inlet means from said open wall;

said housing having means defining at least one bearing surface for engagement with the work, to position said device in relation to the work;

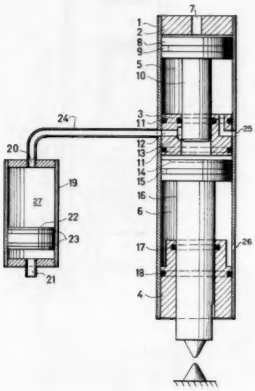
means in said housing enclosure defining an open leading recess communicating with said open wall for directing gas from said enclosure forwardly beyond said leading side wall;

and means in said housing enclosure defining an open trailing recess communicating with said open wall and bridging the weld bead, said trailing recess being dimensioned to direct gas from said enclosure rearwardly beyond said trailing side wall.

3,875,365
PRESSURE INTENSIFIER CYLINDER

Donald Joseph Beneteau, 1293 Front Rd., Amherstburg, Ontario, Canada

Continuation of Ser. No. 188,184, Oct. 12, 1971, abandoned. This application June 1, 1973, Ser. No. 365,958
Claims priority, application Canada, Oct. 30, 1970, 96957
Int. Cl. B23k *11/00*
U.S. Cl. 219—89 9 Claims

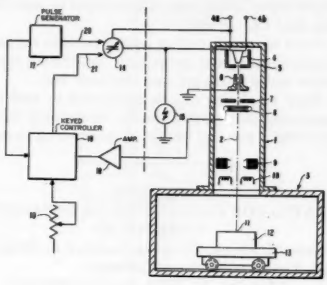


1. A compact pneumatic and hydraulic cylinder structure, utilizing low pressure lines, said apparatus comprising cylindrical wall means, upper end wall means at the upper end of said cylindrical wall means closing off said upper end of said wall means and forming a compressed air inlet communicating with an upper portion of said cylindrical wall means, a pressure intensifying piston having an annular seal around its periphery and a central piston rod affixed thereto and extending therebelow from the side of said piston opposite said upper wall means, fixed wall means inside said cylindrical wall means and spaced at an intermediate portion thereof to divide said cylindrical wall means into an upper chamber and a lower chamber, said fixed wall means being the sole means of separation between said upper and lower chambers, said fixed wall means having a central bore therethrough receiving said piston rod, said fixed wall means also having annular sealing means associated with said central bore in sealing engagement with said piston rod, said fixed wall means also forming a supply passage communicating with an intermediate portion of said bore below said sealing means, means above said intermediate fixed wall means and below said intensifying piston for returning said piston to a position adjacent said upper wall means, a source of hydraulic fluid under pressure communicating with said supply passage for maintaining a full quantity of hydraulic fluid in said lower chamber, means for applying air under pressure to said hydraulic fluid to maintain the hydraulic fluid under pressure, a second piston located in said lower chamber below said fixed wall means and the hydraulic fluid, said second piston having an annular seal around its periphery and a second piston rod extending therebelow from the side of said piston opposite said fixed wall means, lower end wall means closing off the lower end of said lower chamber and having a central bore through which said second piston rod extends to the exterior of said cylindrical wall means, said lower wall means having annular sealing means associated with its central bore in sealing engagement with said second piston rod, and means forming a compressed air inlet communicating with a lower portion of said lower chamber below said second piston to return said second piston to a position adjacent said fixed wall means.

3,875,366
METHOD AND APPARATUS FOR REGULATING THE BEAM CURRENT IN INDUSTRIAL CHARGE CARRIER BEAM APPARATUS

Alfred Von Walter, Munich, Germany, assignor to Steigerwald Strahltechnik GmbH, Munich, Germany

Filed Oct. 25, 1972, Ser. No. 300,787
Claims priority, application Germany, Oct. 28, 1971, 2153695
Int. Cl. B23k *15/00*
U.S. Cl. 219—121 EM 12 Claims

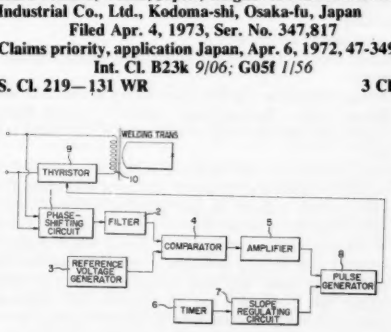


1. A method for regulating the beam current in pulsed charge-carrier beam apparatus, characterized by the steps of directly inductively measuring the amplitude of the pulsed charge-carrier beam about the path of propagation of said pulsating beam, providing a signal indicative of said beam amplitude, determining the peak value of each beam pulse by determining the peak value of the signal representative thereof, supplying a signal representative of the desired peak pulse amplitude, and controlling said beam pulse amplitude, said beam pulse amplitude controlling step comprising the steps of comparing the signals representative of said peak pulse amplitude and said desired amplitude signal to generate a difference signal, and varying said pulsed beam current amplitude dependent upon said difference signal, said pulse amplitude controlling step further comprising the step of storing control information in the interval between consecutive beam pulses.

3,875,367
AC POWER SOURCE VOLTAGE REGULATOR INCLUDING OUTWARD VOLTAGE SLOPE CONTROL

Masaru Tanaka, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kodoma-shi, Osaka-fu, Japan

Filed Apr. 4, 1973, Ser. No. 347,817
Claims priority, application Japan, Apr. 6, 1972, 47-34985
Int. Cl. B23k *9/06*; G05f *1/56*
U.S. Cl. 219—131 WR 3 Claims



1. An AC power source voltage regulator comprising a. a welding transformer,

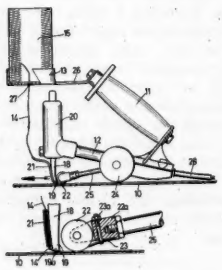
b. a thyristor connected in series with the primary of said welding transformer,
c. a phase shift circuit connected to an AC power source in parallel with said primary of said welding transformer to provide an output of a phase that leads the phase of said power source,
d. a filter for passing an AC portion of the phase shifted output of said phase shift circuit within the frequency range below a predetermined upper cutoff frequency,
e. means providing a DC reference voltage, and a comparator for comparing the phase shifted AC output of said filter with said DC reference voltage and for providing an output signal if and only if the output of said filter is less than said DC voltage,
f. a circuit for generating an output pulse in response to the output signal of said comparator, and means applying said output pulse to trigger said thyristor, and
g. a slope regulating circuit connected to said circuit for generating an output pulse for controlling the width of said output pulse of said pulse generating circuit.

3,875,368

APPARATUS FOR CONNECTING OR REPAIRING FLAT WORKPIECES

Heinz Biewald, Rheda, Germany, assignor to Firma Heinrich Kuper, Rietberg-Westfalen, Germany

Filed Oct. 18, 1973, Ser. No. 407,624
Claims priority, application Austria, Apr. 16, 1973, 3374/73
Int. Cl. H05b *1/00*; B65c *11/00*
U.S. Cl. 219—243 **8 Claims**



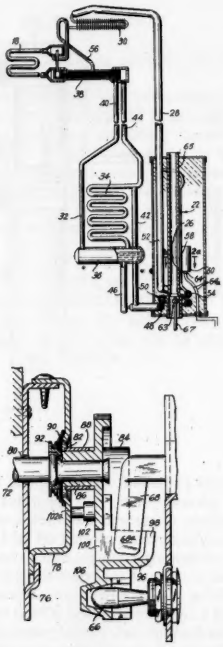
1. A device for butt-connecting or repairing flat workpieces, comprising:
an elongated carrier body;
a handle mounted by one end adjacent an end of said carrier body;
a storage receptacle capable of receiving at least one roll of thread with a thermoplastic adhesive coating thereon, located on the other end of said handle, a pressing member;
heating means for said pressing member mounted transversely of said carrier body at the other end thereof; and guide means located on said pressing member to guide said thread to a position forward of said pressing member in the direction of travel of said device when in use; and wherein said heating means is a hollow cylindrical heat-conducting body, and said pressing member is secured within said body and has an external foot adapted to apply said thread and adhesive to said workpiece or workpieces, flatten said thread and adhesive thereon in the said direction of travel, and cause severance of said thread when said device is moved in a direction opposite to said direction of travel.

3,875,369

CONTROL FOR GAS-ELECTRIC REFRIGERATOR

Kjell Birger Sellerstam, Bandhagen, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Oct. 1, 1973, Ser. No. 402,153
Int. Cl. F27d *11/00*
U.S. Cl. 219—279 **13 Claims**



1. In a combination with a refrigerating system of the type alternatively employing gas or electricity as power sources in which cooling is effected by means of a refrigeration unit having a heat receiving part provided with a gas heat supply means and a heating element, an A.C. electric heat supply means and a D.C. electric heat supply means, each having a separate heating element, a single control mechanism for selectively and independently switching to a selected one of said heat supply means while the other heat supply means are disconnected, said control mechanism being movable in one direction to connect the gas heat supply means to its respective heating element, and to disconnect the electric heat supply means, and said control mechanism being movable in the reverse of said one direction to selectively connect at least one of the D.C. and A.C. electric heat supply means to its respective heating element while said gas heat supply means remains disconnected.

3,875,370

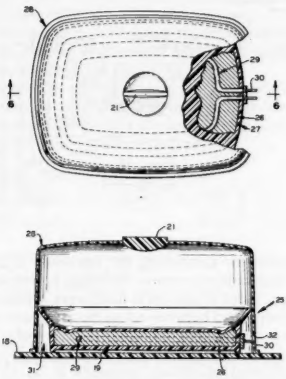
HEAT-RETAINING FOOD SERVICE UNIT

Leslie G. Williams, Murfreesboro, Tenn., assignor to Standex International Corporation, Murfreesboro, Tenn.

Filed Mar. 7, 1974, Ser. No. 448,990
Int. Cl. F27d *11/02*; A47g *23/04*
U.S. Cl. 219—386 **8 Claims**

1. A heat retaining food service unit, said unit comprising, in combination,

a. a metallic three-dimensional body fabricated from a material capable of being heated to a temperature in the order of 250°–300°F. without substantial deformation,
b. a molded plastic jacket and base for said unit, said jacket fitting closely adjacent said body on all sides and having a top surface adapted to receive a food dish,
c. said jacket being molded in place around said body from a synthetic resin material having a coefficient of thermal expansion greater than the coefficient of expansion of the material out of which said body is fabricated, such synthetic resin being capable of transmitting heat from said body to the top surface of said jacket and to a dish lying thereon,
d. a hot food dish having a bottom surface complementary to the top surface of said jacket and an upper surface adapted to receive foods, and
e. a dome shaped cover for said unit, said cover having a closed top and an openended skirt depending from said top, and skirt having a lower edge lying in a plane and a configuration fitting closely circumjacent the perimeter of said dish and said jacket.



3,875,371

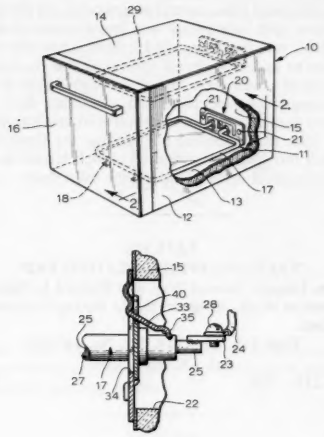
ELECTRIC HEATING ELEMENT WITH A SOCKET ASSEMBLY

Charles Arthur Skinner, Laurel, Md., assignor to Baxter Laboratories, Inc., Morton Grove, Ill.

Filed Jan. 9, 1974, Ser. No. 431,848
Int. Cl. F27d *11/02*
U.S. Cl. 219—404 **6 Claims**

1. A socket assembly for suspending a rod-type heating element from an aperture in an oven housing, said socket assembly comprising, in combination:

means comprising a base plate dimensioned to overlie said aperture, said base plate defining cutout means for allowing the ends of said heating element to extend through said base plate, and including ear-receiving means for receiving a marginal extending car of hinge plate means; means for allowing said base plate means to be affixed to said housing so as to overlie said aperture of said housing; means comprising a hinge plate having a pair of aperture for receiving in locking engagement respective ends of said rod-type heating element, and further having at least one ear along a portion of one margin thereof for engaging said ear receiving means of said base plate whereby said heating element may be pivoted from a normal operating position substantially perpendicular to said side wall to an alternate position angular to said side wall; and means including a resilient tab formed unitarily with and depending from said base plate for bearing against said hinge plate to urge said ear into engagement with said base plate.

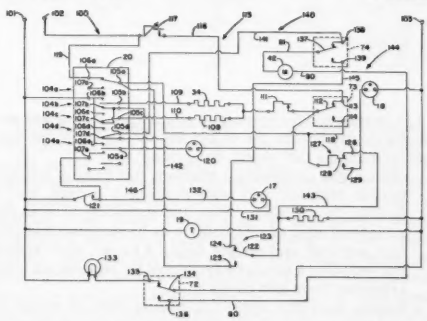


3,875,372

CONTROL CIRCUIT FOR A SELF-CLEANING OVEN

John W. Gilliom, Mansfield, Ohio, assignor to The Tappan Company, Mansfield, Ohio

Division of Ser. No. 438,523, Feb. 1, 1974,. This application Aug. 30, 1974, Ser. No. 502,146
Int. Cl. H05b *1/02*
U.S. Cl. 219—413 **5 Claims**



1. In a control circuit for a self-cleaning oven including a selector switch for multiple mode oven operation using broil and bake electrical heating elements selectively coupled for energization with at least one of said heating elements being energizable during self-cleaning operation, a timer for controlling the duration of self-cleaning operation, and an oven door lock and electrical drive therefor energizable to lock and to unlock the oven door, the improvement comprising:

lock and unlock circuits for energizing said electrical drive respectively to lock and to unlock the oven door, the selector switch providing a connection for potential energization of said lock and unlock circuits when in the self-cleaning position; electrical drive control means actuated by the electrical drive for alternately connecting the latter to one of said lock and unlock circuits; timer

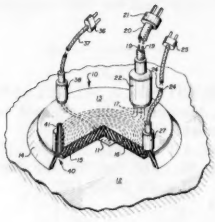
operated switch means for coupling said lock and unlock circuits to a source of electrical energy to energize the electrical drive to lock and to unlock the oven door; whereby for commencing self-cleaning oven operation said electrical drive control means connects the electrical drive to said lock circuit and energization of the timer controls said timer operated switch to provide electrical power to said lock circuit to operate the electrical drive to lock the oven door, and at the completion of the self-cleaning oven operation said electrical drive control means connects the electrical drive to said unlock circuit and after the expiration of the timer the timer operated switch provides power to said unlock circuit to operate said electrical drive to unlock the oven door.

3,875,373

VACUUM-APPLIED HEATING PAD

Patrick A. Lowery, Federal Way, and Richard L. Egger, Bellevue, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Feb. 14, 1974, Ser. No. 442,457
Int. Cl. H05b *3/06*
U.S. Cl. 219—526 **7 Claims**



1. A heating pad for pressing an object against a support and simultaneously heating the object and the region of the support surrounding said object, comprising:

a vacuum pad comprising a relatively thin body of resilient flexible material, said body defining a surface, and a flexible lip depending from and extending around the peripheral edge of said body so as to surround said surface and with said surface define a cavity, said vacuum pad including a passageway suitable for allowing air to be exhausted from said cavity;

a flexible sheet-like, metal foil, heating element affixed to said surface of said body, said heating element defining an aperture spaced inwardly from the periphery thereof, and,

electrical connecting means for connecting said heating element to a source of electricity;

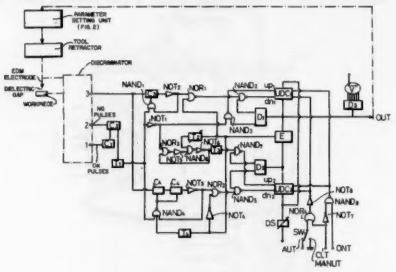
said vacuum pad and said heating element being formed in a manner such that when: (a) said lip is placed against a suitable support; (b) an object is located between said surface and said support in the region generally defined by said aperture; and (c) said cavity is evacuated, said object is pressed against said support and substantially all of said thin, sheet-like, flexible heating element is pressed toward said support around said object in a manner such that heat generated by said heating element causes said support to be heated in the region surrounding said object.

3,875,374

EDM PARAMETER CONTROL SYSTEM

Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japan Research Inc., Midoriku, Yokohama, Japan

Filed Mar. 7, 1973, Ser. No. 338,849
Int. Cl. B23p *1/08*
U.S. Cl. 219—69 G **1 Claim**



1. A system for controlling the operation of an electrical discharge machining apparatus including power-supply means for passing a series of electrical discharges across a dielectric-filled machining gap between a tool electrode and a workpiece to remove material from the workpiece, servofeed means for relatively displacing said tool electrode and said workpiece as material removal therefrom proceeds so as to maintain a substantially constant working-gap spacing, and reciprocating means operable independently of said servofeed means for intermittently retracting said tool relative to said workpiece to clear machining product from said gap, said system comprising:

monitoring circuit means electrically connected across said machining gap and responsive to the electrical characteristics of the machining gap for providing a first signal upon detection of the occurrence of an undesirable machining condition determined by electrical characteristics different from those prevalent upon material removal in the gap within a first time period, and providing a second signal upon nondetection of said undesirable machining condition in the gap throughout a second time period, said monitoring circuit means including timing means for imparting to said second period a duration greater than that of said first period;

control means electrically connected in circuit with the output of said monitoring circuit means and operatively connected with said reciprocating means for controlling the distance through which said tool electrode and said workpiece are relatively retracted and the intervening time interval between successive cycles of intermittent relative retraction of said tool electrode and said workpiece so as to increase said distance and simultaneously decrease said time interval in response to said first signal and to decrease said distance and simultaneously increase said time interval in response to said second signal.

3,875,375

READER DEVICE FOR CODED IDENTIFICATION CARD

Thomas John Scuitto, Malibu, and David Chester Kramer, Redondo Beach, both of Calif., assignors to Frederick D. Toye, Woodland Hills, Calif. and Frederick N. Toye, Sherman Oaks, Calif.

Filed June 18, 1973, Ser. No. 370,912
Int. Cl. G06k *7/14*
U.S. Cl. 235—61.7 B **22 Claims**

1. A reader for identification cards and the like of the type having a series of translucent data zones, each of which is neither opaque nor transparent, and a related series of data

acquisition zones for serially clocking said data zones during decoding, including in combination:

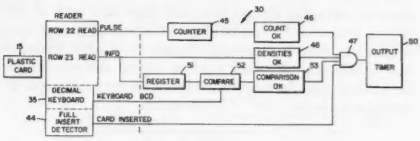
first sensing means for reading said data acquisition row and producing therefrom an electrical signal varying in amplitude,

clocking means actuated by said first sensing means, for converting said signal to a series of clocking pulses, one for each data acquisition zone,

counting means for counting the number of clocking pulses set up by said clocking means and indicating when a predetermined number of them has been read, corresponding to the number of data acquisition zones found on a normal, authentic said card,

second sensing means for reading the light transmissivity of each data zone in said row of data zones and producing therefore an electrical signal,

error-determining means connected electrically to said second sensing means for determining, in synchronization with a corresponding said clock pulse, whether each and



every data zone lies within a predetermined range of transmissivity, being neither too opaque or too transparent,

differentiation means connected electrically to said second sensing means for differentiating between a plurality of transmissivities within said predetermined range and thereby providing a value for each said data zone, according to its transmissivity,

comparison means for electrically comparing each said value with a predetermined authentication code and thereby determining whether said data-zone series corresponds to said authentication code, and

authentication means connected to each of said counting means, said error-determining means, and said comparison means for indicating authenticity when the predetermined number of pulses has been counted without any errors having been found in any said data zone and when said comparison means indicates full correspondence of said data-zone series with the predetermined authentic code.

3,875,376
INTERGRATING COUNTER

Sadao Kakeno, Yokohama, Japan, assignor to Kabushiki Kaisha Richo, Ota-ku, Tokyo, Japan

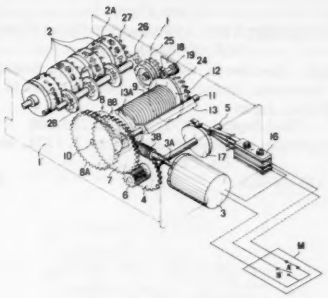
Filed Dec. 16, 1972, Ser. No. 318,454

Claims priority, application Japan, Dec. 28, 1971, 47-2644; Apr. 5, 1972, 47-33459; Aug. 31, 1972, 47-86655; Apr. 7, 1972, 47-40553[U]

Int. Cl. G06m *1/04*

U.S. Cl. 235—92 C **7 Claims**

1. An integrating counter comprising drive means adapted to be actuated by electric signals from a meter, digit wheel means comprising a predetermined number of digit wheels adapted to be driven by said drive means and including a lowest order digit wheel, first rotating means adapted to be angularly rotated by said drive means, second rotating means adapted to be rotated intermittently, energy storing means comprising a spring connecting said two rotating means and adapted to store the energy of rotation of the first rotating means, sensing means adapted to generate output signals in accord with the degree of angular rotation of each digit wheel, and control means adapted to release the second rotating means and cause the same to rotate instantaneously by the action of the spring when the first rotating means has been rotated through a predetermined angle and means connecting



the lowest order digit wheel to the second rotating means for concurrent instantaneous rotation therewith upon the release of said second rotating means.

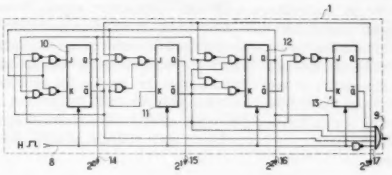
3,875,377
NOISE GENERATOR

Jean-Jacques Hirsch, Echirolles, France, assignor to Societe Generale De Constructions Electriques et Mechaniques (Alsthom), Paris, France

Filed Dec. 29, 1972, Ser. No. 319,238

Int. Cl. H03k *21/10*

U.S. Cl. 235—92 LG **4 Claims**



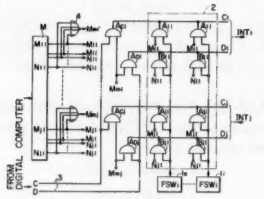
1. A noise generator more particularly for the conversion of a digital signal into a stochastic representation comprising a binary coded decimal counter including as many stages in series producing the values from 0 to 9 in binary form as there are decades of the noise to be produced, input means for applying clock pulses to the stage of the counter whose weighting is the heaviest and in which each of the other stages receives, from the preceding stage, corresponding to the decade whose weighting is immediately greater, a signal whose frequency is ten times smaller than the frequency of the signal received by that preceding stage, each stage of said counter including gating means for producing successive values in the order: 5, 2, 7, 1, 8, 3, 6, 0, 9, 4 to appear at the outputs thereof, wherein each stage of said counter includes first, second, third, and fourth J-K flip-flops, said gating means including a first NAND gate having one input connected to the reset output of said first flip-flop, and a second input connected to the reset output of said second flip-flop, a second NAND gate having one input connected to the output of said first NAND gate and a second input connected to the set output of said third flip-flop, the output of said second NAND gate being connected to the J input of said first flip-flop, a third NAND gate having one input connected to the set output of said first flip-flop and a second input connected to the reset output of said second flip-flop, and a fourth NAND gate having one input connected to the output of said third NAND gate and a second input connected to the set output of said

third flip-flop, the output of said fourth NAND gate being connected to the K input of said first flip-flop.

3,875,378
HYBRID COMPUTING APPARATUS OF AUTOMATIC CONNECTION TYPE

Kenji Maio, Kokubunji; Shigeru Watanabe, Kodaira, and Norio Yokozawa, Fuchu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sept. 1, 1972, Ser. No. 285,908
Claims priority, application Japan, Sept. 2, 1971, 46-67637
Int. Cl. G06j *1/00*
U.S. Cl. 235—150.5 **4 Claims**

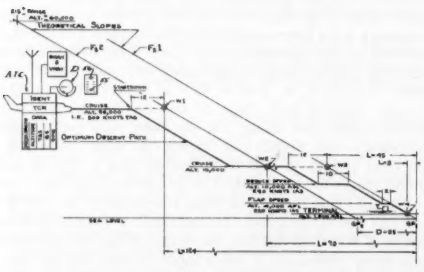


1. A hybrid computing apparatus of the automatic connection type comprising a digital computer for producing an instruction signal, an analog computer having a plurality of analog computing elements including integrators, and an automatic control system for controlling the mode of operation of selected ones of said integrators of said analog computer in accordance with the instruction signal from said digital computer, said automatic control system including comparators for decision on the end result of the computation of said integrators, means for supplying an output of said comparators to said digital computer, means for generating a mode of operation control signal for said integrators and a switch for supplying the mode of operation control signal to said integrators in accordance with outputs of said comparators.

3,875,379
TERMINAL AIRWAYS TRAFFIC CONTROL SYSTEM

Carl W. Vietor, 1612 Stradella Rd., Los Angeles, Calif. 90024

Continuation of Ser. No. 139,370, May 3, 1971, Pat. No. 3,758,765. This application Aug. 13, 1973, Ser. No. 387,902
Int. Cl. G06f *15/48, 15/50*
U.S. Cl. 235—150.22 **33 Claims**



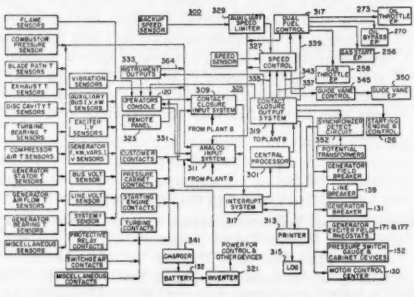
3. An aircraft wind information center comprising: means generating an altitude signal, means generating a true airspeed signal, means generating a groundspeed signal, and wind storage means including, wind shear means with storage areas arranged according to altitude, a data comparator means receiving and differentiating said true airspeed and groundspeed signals and providing therefrom a positive or negative wind shear signal, and triggering means selectively responsive to said altitude signal and placeably restoring into a corresponding storage area the wind shear signal-data as current wind shear data.

13. Apparatus for producing a time interval signal corresponding to the spacing between next adjacent in time of in-flight aircraft and comprising: a route selector means selectively adjustable to at least one programmed route, time prediction means including, a program means producing time to waypoint signals for aircraft along said programmed route and next adjacent in time aircraft; and a time assignment means having a pair of memory means, having a recorder means for storing said time to waypoint signals from aircraft next adjacent in time into said memory means, having reader means for withdrawing said time to waypoint signals of said aircraft next adjacent in time from said memory means, having a phase shifting timer reversely activating the said recorder means and said reader means to alternately record and withdraw said time to waypoint signals into and from said pair of memory means respectively, and having a comparator means receiving sequential time to waypoint signals from said reader means and producing the time interval signal difference between successive time to waypoint signals of next adjacent in time in-flight aircraft.

3,875,380
INDUSTRIAL GAS TURBINE POWER PLANT CONTROL SYSTEM AND METHOD IMPLEMENTING IMPROVED DUAL FUEL SCHEDULING ALGORITHM PERMITTING AUTOMATIC FUEL TRANSFER UNDER LOAD

Gerald L. Rankin, Irwin, Pa., assignor to Westinghouse Electric Company, Pittsburgh, Pa.

Continuation of Ser. No. 204,944, Dec. 6, 1971, abandoned. This application Feb. 14, 1973, Ser. No. 332,457
Int. Cl. G05b *15/00;* **F23n** *1/00*
U.S. Cl. 235—151.1 **11 Claims**



1. A system for operating a gas turbine electric power plant comprising a gas turbine having compressor, combustion and turbine elements, a generator having a field winding and being coupled to said turbine for drive power, a dual fuel system having primary fuel and secondary fuel subsystems for supplying either or both fuels to said gas turbine combustion elements, means for exciting said generator field winding, a control system including a digital computer and input/output system therefor, said input/output system comprising at least an operator's control panel having dual fuel system control option selection indicators thereon for providing control system inputs representative of a desired dual fuel operating mode, a plurality of sensors disposed to monitor selected turbine parameters, said plurality of sensors comprising at least an arrangement of fuel pressure sensors, said plurality of

sensors providing control system inputs representative of said turbine parameters, means for selectively operating said primary and said second fuel subsystems to energize said turbine, means for controlling said exciting means, and means for operating said computer to continuously monitor control system sensor inputs representative of said turbine parameters to determine appropriate control actions in response to time varying combinations of said sensor inputs and control system inputs from at least said operator's control panel, each of said time varying combinations comprising at least an input from said pressure sensors.

3,875,381

STRESS WAVE EMISSION DEFECT LOCATION SYSTEM

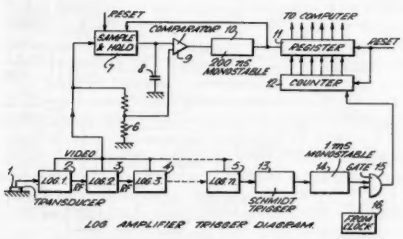
Peter Maurice Wingfield, deceased, late of Winterbourn Kingston, England (Joanna Wingfield, executrix), and Roger Hill Warren, Poole, England, assignors to National Research Development Corporation, London, England

Filed May 15, 1972, Ser. No. 253,614

Claims priority, application United Kingdom, May 13, 1971, 14839/71

Int. Cl. G01n *29/04*; **G06f** *15/20*

U.S. Cl. 235—151.3 **2 Claims**



1. A stress wave emission defect location system for structures including transducer means coupled to the structure under test to convert said stress wave emission to electrical signals, logarithmic amplifier means joined to said transducer means to amplify said signals, circuit means coupled to said logarithmic amplifier means whereby the amplified signals initiate the gating of clock pulses from clock means into counter means, said logarithmic amplifier means including envelope (video) detector means, the outputs of said envelope (video) detector means being summed to produce a video signal whose amplitude increases with time until the stress wave emission peak is reached, sample and hold circuit means in which a sample of each cycle of the video signal is held for comparison with a proportion of the next succeeding cycle and comparator means to compare the amplitudes of successive cycles of said video signal whereby the opening of register means to accept and store the contemporary total of clock pulses in said counter means is controlled.

3,875,382

PATH GENERATING APPARATUS AND METHOD PARTICULARLY FOR GENERATING A TWO-LOBED EPITROCHOID CONTOUR

Hymie Cutler, 16230 Santer Rosa, Detroit, Mich. 48221

Filed July 26, 1973, Ser. No. 382,862

Int. Cl. G06f *15/46*

U.S. Cl. 235—151.11 **22 Claims**

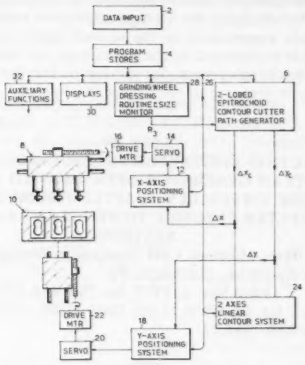
1. Apparatus for displacing a tracing tool with respect to an article to trace thereon a two-lobed epitrochoid contour defined by the trace of point in a generating circle as it rolls around a base circle, the distance of the trace point from the center of the generating circle being *a*, the radius of the base circle being *b* and equal to twice the radius of the generating circle, comprising:

a data input for entering data relating to *a* and *b;*

an R_1 circle generator generating electrical signals representing a first circular path having a radius equal to $3b/2$;

an R_2 circle generator generating electrical signals representing a second circular path having a radius equal to *a;*

a circle coordinator coordinating the R_1 and R_2 circle generators such that the angle of rotation (α_2) of the R_2



circle generator signals is substantially maintained at three times the angle of rotation (α_1) of the R_1 circle generator signals;

and control means controlled by said R_1 and R_2 generator signals for controlling the relative displacement of the tracing tool with respect to said article to trace thereon the two-lobed epitrochoid contour.

3,875,383

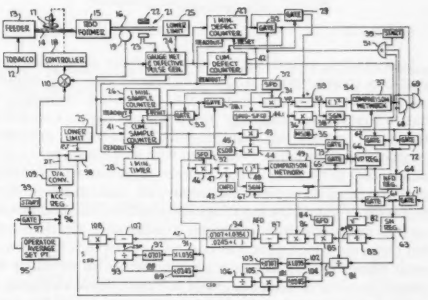
CONTROL SYSTEM FOR AVERAGE VALUE SETPOINT

Gerald H. Somerville, and Maris A. Straumanis, both of Columbus, Ohio, assignors to Industrial Nucleonics Corporation

Filed Mar. 29, 1973, Ser. No. 346,034

Int. Cl. G06g *7/66*; **G05b** *13/02*

U.S. Cl. 235—151.13 **30 Claims**



1. Apparatus for controlling the average value of a material property in response to statistical variations of the property, said property having a limit value beyond which the material is considered defective, the apparatus controlling a setpoint for the average value so that a predetermined amount of the material has property values beyond the limit value, said predetermined amount being a fraction defective, comprising means monitoring the property for deriving a first signal indicative of measured variations of the property, means responsive to the first signal for deriving a second signal indicative of the spread of measured values since the last time the average setpoint value was changed, means for deriving a further signal indicative of the quantity of measurements used to form

the second signal, means responsive to the further signal for deriving a third signal indicative of the expected spread of values for the fraction defective, means responsive to the further signal to cause the magnitude of the third signal to effectively approach a predetermined limit value from two sides as the quantity of measurements increases beyond a predetermined number since the last time the average setpoint value was changed, means responsive to the second and third signals for changing the average setpoint in response to the magnitude represented by the second signal exceeding the magnitude represented by the third signal, and means responsive to the changing means for varying the average value of the property in response to the change in setpoint.

3,875,384

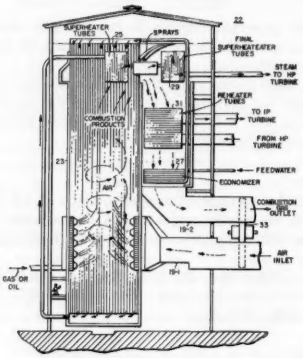
PROTECTION SYSTEM FOR TRANSFERRING TURBINE AND STEAM GENERATOR OPERATION TO A BACKUP MODE ESPECIALLY ADAPTED FOR MULTIPLE COMPUTER ELECTRIC POWER PLANT CONTROL SYSTEMS

Guy E. Davis, Martinez, Calif., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 6, 1973, Ser. No. 413,277

Int. Cl. G05b *15/00*; **G06f** *15/06, 15/56*

U.S. Cl. 235—151.21 **25 Claims**



1. A control system for an electric power plant having at least one steam turbine and a steam generator, said control system comprising multiple digital computers including at least a first digital computer and a second digital computer, means for generating input signals representing predetermined process variables associated with said steam generator, means for generating input signals representing predetermined process variables associated with said steam turbine, means for coupling the input signals to both of said computers, each of said computers including substantially identical control elements which generate control outputs as a function of input signals in various control loops, means for coupling the control outputs of each computer to controllable elements of said steam generator and said steam turbine, means for sensing predetermined circuit conditions representing malfunctions in said input signal coupling means for each computer, means for sensing predetermined circuit conditions representing malfunctions in said control output coupling means for each computer, means for sensing predetermined computer conditions indirectly related to said computer control elements and representing malfunctions in the operation of each of said computers, means for substantially conforming the structure of one of said computers in a standby state to the structure of the other and controlling one of said computers in real time including means for generating control outputs in the one standby computer substantially equal to those from said other controlling computer, and means for operating said output coupling means normally to connect the outputs of said controlling computer to the steam generator and turbine controllable elements and to connect the outputs of said standby computer to the steam generator and turbine controllable elements when said sensing means detects a control system malfunction associated with the controlling computer so as to execute a transfer in the control of the steam generator and the turbine from said one computer to said other computer substantially without disturbing the plant power generation.

3,875,385

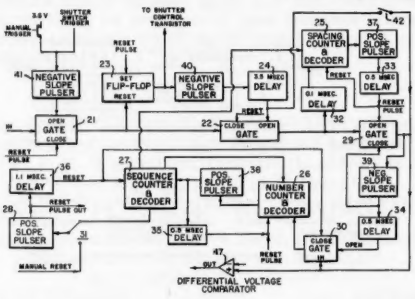
PROGRAMMED-SWEEP UNIT FOR EXPANDING THE CAPABILITIES OF A COMPUTER OF AVERAGE TRANSIENTS

Lawrence H. Hall, Woodland Hills, Calif., assignor to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.

Continuation-in-part of Ser. No. 293,176, Sept. 28, 1972, abandoned. This application Mar. 8, 1974, Ser. No. 449,586

Int. Cl. G06f *15/36*; **H03k** *7/08*

U.S. Cl. 235—151.35 **1 Claim**



1. A programmed-sweep unit for automatically varying the dwell time of a computer of average transients during sweep comprising:

a first gating means opened by an external trigger;

a flip-flop means electrically connected to the output of said first gating means;

a first negative slope pulser electrically connected to said flip-flop means for producing an output pulse in response to a negative going pulse from said flip-flop means;

a first delay means electrically connected to said first negative slope pulser to delay the output pulse of said first negative slope pulser by a preset time period;

second gating means opened by a pulse from said first delay means and electrically connected to the output of said first gating means;

second delay means electrically connected to the output of said second gating means;

a spacing counter electrically connected to the output of said second delay means;

a first decoder means electrically connected to said spacing counter for providing an output pulse only when the state of said spacing counter coincides with a preset value corresponding to a desired pulse-rate-interval;

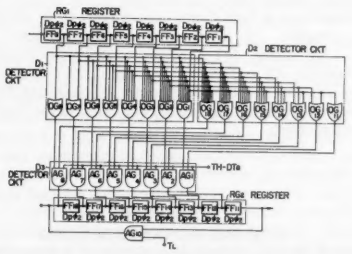
a first positive slope pulser electrically connected to the output of said first decoder means for providing an output pulse in response to a positive going output from said first decoder means;

a third delay means electrically connected to the output of said first positive pulser to provide an output pulse delayed by a preset time period;

third gating means electrically connected to said third delay means so as to open said third gating means upon an input pulse from said third delay means, and further connected to the output of said second gating means;

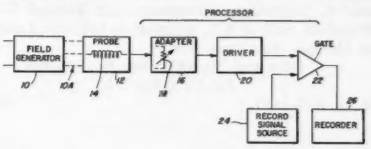
a second negative slope pulser electrically connected to the output of said third gating means for providing an output pulse in response to a negative going pulse from said third gating means;
a fourth delay means electrically connected to said second negative slope pulser for providing an output at a preset time delay period;
a fourth gating means electrically connected to the output of said third delay and further connected to the output of said second gating means;
a number counter electrically connected to the output of said fourth gating means;
a second decoder means electrically connected to said number counter for providing an output pulse only when the state of said number counter coincides with a preset value corresponding to a desired sequence of pulses;
a second positive slope pulser electrically connected to the output of said number counter and decoder;
a fifth delay means electrically connected to the output of said second positive slope pulser which resets said number counter and decoder at a preset time delay interval; a sequence counter electrically connected to the output of said second positive slope pulser;
a third decoder means electrically connected to said sequence counter which provides an output pulse only when the state of the counter coincides with a preset value corresponding to the end of a preset sequence wherein said sequence counter and third decoder transmits a signal to both said spacing counter and said number counter thereby automatically varying the preset pulse-rate-interval and pulse number;
a third positive slope pulser means electrically connected to said sequence counter and decoder;
a sixth delay means electrically connected to said fourth positive slope pulser for producing an output pulse which resets said sequence counter and decoder;
a differential voltage comparator electrically connected to said third gating means for providing an output to vary the dwell time of the computer of average transients according to preset values.

3,875,386
ZERO SUPPRESSION CIRCUIT
Takao Tsuiki, and Yoshikazu Hatsukano, both of Tokyo, Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Oct. 4, 1973, Ser. No. 403,556
Claims priority, application Japan, Oct. 4, 1972, 47-99047
Int. Cl. G06f 3/14
U.S. Cl. 235—152 **8 Claims**



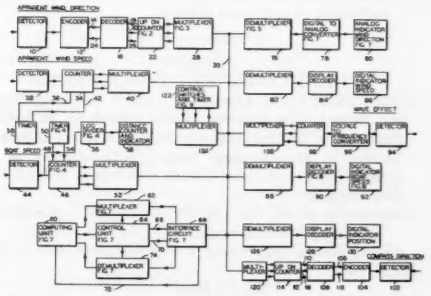
1. A zero suppression circuit comprising:
first means, responsive to an input signal representative of an *n*-digit decimal number, and having an *n* element memory capacity, for storing therein respective signals representative of whether a digit of said decimal number is the digit zero, and including means for storing, in one of said elements, a signal representative of the position of a decimal point in said decimal number; and
second means, responsive to the contents of said first means, for detecting the presence of the digit zero at those digit positions of said *n* digit decimal number which are unnecessary for completely representing said decimal number and comprising a first detector circuit including *n* gate circuits respectively coupled to the *n* memory elements of said first means, so that the outputs of the first to *i*-th memory elements of said first means are coupled to the *i*-th gate circuit of said first detector circuit, wherein $1 \leq i \leq n$.

3,875,387
MAGNETIC OPERATIONS MONITOR
Michael E. Bostic, 85 E. Henrietta Rd., Rochester, N.Y. 14620
Division of Ser. No. 256,659, May 25, 1972,. This application Mar. 21, 1974, Ser. No. 453,233
Int. Cl. B41l 39/02
U.S. Cl. 235—92 SB **2 Claims**



1. A recorder for recording over a time interval events occurring in a copying or document reproduction machine, said machine having a component which when actuated reflects the occurrence of the event being recorded together with electromagnetic drive means for actuating said component, the combination of: a magnetic sensor adapted for disposition adjacent said drive means so as to produce an electrical signal in response to a magnetic variation in said drive means representing actuation of said machine component, first means for converting the electrical signal from said sensor to a gating signal, second means coupled to said first means and responsive to said gating signal for providing a recording signal representing actuation of said component, and recording means coupled to said second means for recording said recording signal.

3,875,388
MODULAR SYSTEM FOR EVALUATING SAILBOAT PERFORMANCE
Robert H. Luten, Los Gatos, and Lucian W. Taylor, Los Altos, both of Calif., assignors to Velcon Filters, Inc., San Jose, Calif.
Filed Nov. 5, 1973, Ser. No. 412,593
Int. Cl. G06g 7/78
U.S. Cl. 235—150.2 **61 Claims**



1. A system for evaluating sailboat performance comprising:
a signal source representing a variable having an effect upon sailboat performance;

counting means connected to said source for producing a binary coded decimal input signal in parallel form representing said variable;

multiplexing means connected to said counting means and responsive to a first address signal for converting said binary coded decimal input a signal from parallel to serial form;

computing means for generating said first address signal and responsive to said binary coded decimal input signal for generating an output signal representing a sailboat performance characteristic; and

bus means connecting said multiplexing means and said computing means.

3,875,389

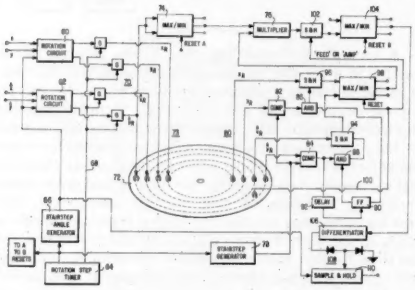
METHOD AND APPARATUS FOR AUTOMATIC OPTIMAL LAYOUT OF SHAPES TO BE CUT FROM MATERIAL

Daniel G. McFadden, Parsippany, and Richard C. Levine, Plainfield, both of N.J., assignors to LeBoeuf, Lamb, Leiby & MacRae, New York, N.Y.

Filed Aug. 30, 1972, Ser. No. 284,879

Int. Cl. G06g *7/48*

U.S. Cl. 235—151 **46 Claims**



1. Apparatus for automatically orienting objects of predetermined geometrical shape upon sheet material, the outline of said shape being represented by object contour signals corresponding to the co-ordinate location of representative points on said outline, said apparatus comprising:

signal generating means responsive to said object contour signals for generating envelop signals which correspond to a contour which differs from at least portions of the object contour by a predetermined amount; and

calculating means responsive to said object contour and said envelop signals for determining the orientation of said object which corresponds to optimal efficiency in utilization of said sheet material.

3,875,390

ON-LINE COMPUTER CONTROL SYSTEM

Edward Stuart Eccles, Gloucester; Andrew Hurlstone Waddicor, Bristol; Eric Roberts, Bristol, and John McNamara, Bristol, all of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain & Northern Ireland, London, England

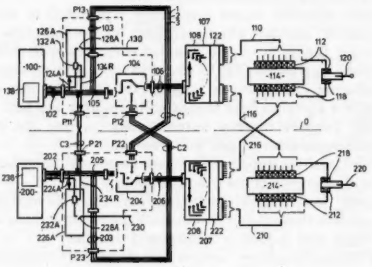
Continuation of Ser. No. 160,098, July 6, 1971, abandoned. This application July 13, 1973, Ser. No. 378,821

Claims priority, application United Kingdom, July 9, 1970, 33326/70

Int. Cl. G06f *15/16*

U.S. Cl. 235—153 AE **7 Claims**

1. An on-line computer control system for a technical plant comprising a first digital computer (**100**) for controlling the plant (**114**), a second digital computer (**200**) for controlling the plant, means (**139, 138:1,1,150**) provided in respect of the first computer for generating a timing signal (**151**) at regular intervals of time, means (**239, 238:1.1, 150**) provided in respect of the second computer for generating a timing signal (**251**) at regular intervals of time, means (**138,238**) provided in each computer for controlling the plant when connected thereto, first switch means (**104**) arranged between the two computers and the plant and switchable between conditions in which the plant is connected respectively to the first and to the second computer, first switch operating means (**138–2.0**) provided in the first computer and responsive to the timing signal thereof for operating the switching means to connect the first computer to the plant for the control thereof, fault recognition means (**138,126**) for recognizing the occurrence



of a fault in the first computer and outputting a fault signal (**144,145,157**) in response to the occurrence of a fault, means (**128**) responsive to a fault signal for disabling the first computer, means (**132**) responsive to disablement of the first computer for producing a disablement signal (**134RY**), means (**C3**) for communicating the disablement signal to the second computer, means (**238–1.2**) provided in the second computer and responsive to said timing signals thereof for checking for the presence of a said disablement signal, means (238–1.3,4.1) provided in the second computer responsive to the presence of a said disablement signal and responsive to the timing signal of the second computer for operating the switching means to connect the second computer to the plant for the control thereof.

3,875,391

PIPELINE SIGNAL PROCESSOR

Gerald N. Shapiro, Arlington, and Herbert S. Sobel, Wayland, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Nov. 2, 1973, Ser. No. 412,070

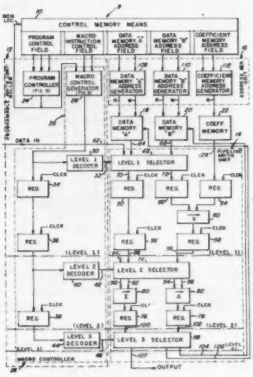
Int. Cl. G06f *7/38, 15/00*

U.S. Cl. 235—156 **9 Claims**

1. A signal processor, comprising:

a. an arithmetic unit having a plurality of serially coupled levels of arithmetic processing circuitry; and,

b. a controller having a corresponding plurality of serially coupled levels of control circuitry, each one of such levels



of control circuitry being coupled to a corresponding one of the levels of arithmetic processing circuitry.

3,875,392

ELECTRICAL COMPUTING SYSTEM FOR SIMULTANEOUSLY PERFORMING A PLURALITY OF OPERATIONS ON TWO OR MORE OPERANDS

Miner S. Keeler, II, 2525 Indian Trl., S.E., Grand Rapids, Mich. 49506

Filed June 18, 1973, Ser. No. 371,258

Int. Cl. G06f *7/38*

U.S. Cl. 235—156 **12 Claims**

1. A calculating system for simultaneously performing and outputting the solutions of multiple operations on two or more operands comprising:

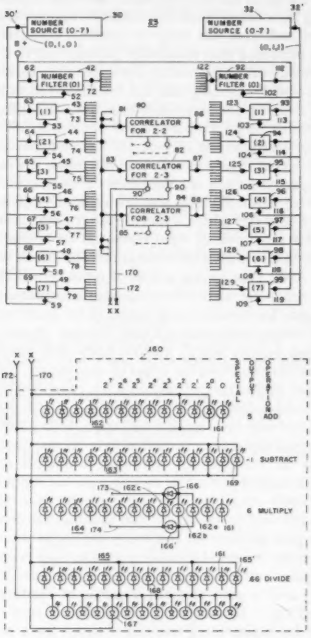
number source means for generating multiple bit binary electrical signals uniquely representing each number used in the system;

first number detector means coupled to said number source means for providing a unique output signal identifying a first number when actuated by a signal from said number source means representing said first number;

second number detector means coupled to said number source means for providing a unique output signal identifying a second number when actuated by a signal from said number source representing said second number, wherein said first and second number detectors each comprises at least one series of binary signal responsive circuits, each series including one circuit uniquely associated with each number of the system and wherein each circuit includes a control terminal coupled to said number source means and an output terminal providing an output signal thereat when a multiple bit binary electrical signal applied to said control terminal from said number source means corresponds to the number uniquely identified by said circuit;

additional circuit means coupled to said first and second number detector means to provide an output signal uniquely identifying the combination of first and second numbers entered into the system by said number source means; and

output circuit means coupled to said additional circuit means and responsive to signals therefrom to provide a simultaneous output representation of the solutions for



two or more operations performed on numbers entered into said system.

3,875,393

DIGITAL SERIAL ARITHMETIC UNIT

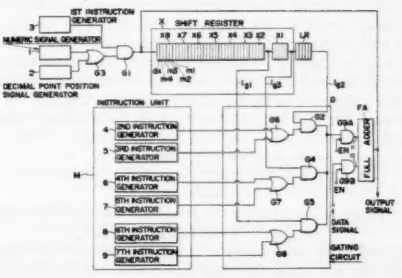
Akira Nagano, Nagaokakyo; Kazuaki Urasaki, Mukou, and Masatugu Miura, Kyoto, all of Japan, assignors to Omron Tateisi Electronics Co., Ltd., Kyoto, Japan

Filed Dec. 20, 1972, Ser. No. 316,900

Claims priority, application Japan, Dec. 21, 1971, 46-104452; Dec. 21, 1971, 46-104453; Dec. 24, 1971, 47-349; Dec. 28, 1971, 47-969

Int. Cl. G06f *7/50*

U.S. Cl. 235—176 **10 Claims**



1. A data processing device which comprises a shift register having a plurality of series-connected stages, each of which is

composed of a plurality of bit cells, at least one of the cells for storing a first information and the remaining cells for storing a second information; circulation path means connected between the input and the output of said shift register; means for shifting the content stored in said shift register from one bit to another and from one stage to another; said circulation path means including gate means for passing said first information therethrough during a timing corresponding to said first information and for passing said second information therethrough during a timing corresponding to said second information; and said circulation path means further including full adder having an input for receiving the second information from said shift register via said gate means, said full adder for performing an arithmetic operation of calculation between said second information received thereby and information applied to another input of said full adder; said full adder comprising a first half adder having a pair of input terminals for respectively receiving two binary coded informations to be added to each other, a first AND gate having a pair of input terminals for respectively receiving said binary coded informations, a second AND gate having one input terminal for receiving one of said binary coded informations and another input terminal for receiving a carry signal, a third AND gate having one input terminal for receiving the other of said binary coded informations and another input terminal for receiving said carry signal, a one-bit delay circuit responsive to an output signal from any one of said first, second and third AND gates for delaying said output signal for a period of time corresponding to one bit thereby to subsequently generate a one-bit delayed carry signal, a second half adder having a pair of input terminals for respectively receiving an output signal from said first half adder and said carry signal from said one-bit delay circuit, an inhibit gate element for inhibiting the application of the carry signal from the one-bit delay circuit to said second and third AND gates and said second half adder for a predetermined bit timing, and a gate element capable of feeding the one-bit delayed carry signal back to the input of said one-bit delay circuit for maintaining said carry signal for a period of time corresponding to said bit timing.

3,875,394
CORRELATION TYPE PHASE DETECTOR

Willis H. Shapely, Acting Administrator of the National Aeronautics and Space Administration, with respect to an invention of William D. T. Davies, Getzville, N.Y., and Stephen C. Martin, Niagara Falls, Ontario, Canada
Falls, Ontario, Canada

Filed Apr. 20, 1973, Ser. No. 353,162
Int. Cl. G06g *7/19, 7/22*
U.S. Cl. 235—181 **10 Claims**

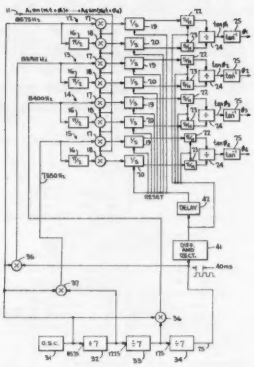
1. Apparatus for determining the phase angles of each of a plurality of signals relative to predetermined phase angles of reference waves having the same frequencies as the signals, said plural signals being frequency multiplexed on a common line and each having a different frequency, said frequencies all being an integral multiple of a further frequency, comprising means responsive to the frequency multiplexed signals on the common line and the reference waves for deriving product signals indicative of sin $(\omega_i t + \phi_1)$ sin $\omega_i t$ and sin $(\omega_i t + \phi_i)$ cos $\omega_i t$ for each of the frequencies, where:

$\omega_i = 2\pi f_i$, f_i is selectively each of the frequencies,

t = time, and

ϕ_i = phase angle between the reference wave and the signal for each of the frequencies f_i,

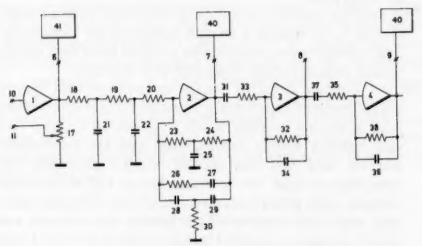
integration means responsive to each of the product signals, means for activating the integration means for the same time period for each product signal, said period being an integral multiple of the period of the further frequency, whereby the integration means derives, at the end of each activation period, first and second signals respectively indicative of sin ϕ and cos ϕ for each of the frequencies, and computer means responsive to the first and second signals for each of the frequencies for deriving an indication of ϕ for each of the frequencies.



3,875,395
ARRANGEMENT FOR AND METHOD OF OBTAINING A FIRST, SECOND OR FOLLOWING DERIVATIVE OF A TITRATION CURVE

Jaromir Jilek, Olomouc, Czechoslovakia, assignor to Universita Palackeho V. Olomouci, Olomouc, Czechoslovakia

Filed Oct. 18, 1972, Ser. No. 298,614
Claims priority, application Czechoslovakia, Oct. 19, 1972, 7297-72
Int. Cl. G06g *7/18*
U.S. Cl. 235—183 **3 Claims**

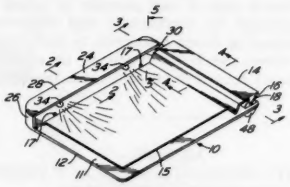


1. A circuit arrangement for obtaining a first derivative of a titration curve with respect to time, comprising a low pass frequency filter connected to titration monitoring means for eliminating interference signals generated by the addition of reaction agents, and at least one derivator with an operational amplifier for obtaining a derivation of the titration curve over time connected to the filter, and at least one recording device for recording the course of the obtained curve of the first derivative connected to the output of the said derivator.

3,875,396
ILLUMINATED CLIPBOARD

Stephen R. Webb, Linesville, Pa., assignor to Illuminite Corporation, Harrisburg, Pa.

Filed Nov. 12, 1973, Ser. No. 415,094
Int. Cl. F21v *33/00*
U.S. Cl. 240—6.4 B **4 Claims**

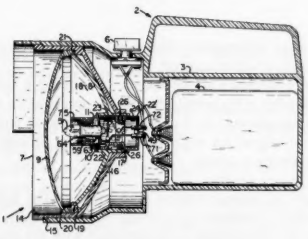


1. An illuminated clipboard comprising a substantially planar base having an upper and lower surface; a battery housing mounted on said base adjacent one end thereof, said battery housing being comprised of upper and lower substantially semi-cylindrical members having substantially planar side walls and including means for securing said members together, said upper member being integral with said base and said lower member lying below said surface to provide a stand for said base; a spring clip means pivotally mounted to said substantially planar side walls of said battery housing on said upper surface of said battery adjacent said one end thereof for holding paper on said upper surface; an elongated light housing mounted on said upper surface parallel to and adjacent one side edge thereof and opening outwardly toward said upper surface; a light source and reflector means mounted within said housing and being adapted to illuminate the upper surface of said base; means providing electrical connections between said battery housing and said light source and including switch means adapted to selectively make and break said electrical connections; and a plurality of upwardly extending stop means positioned on said upper surface adjacent the opening of said light housing for aligning paper placed on said clipboard and for preventing said paper from entering said light housing.

3,875,397
MEANS FOR PRODUCING COLORED LIGHT

Thomas H. Nicholl, 1204 W. 27th St., Kansas City, Mo. 64108

Filed Apr. 15, 1974, Ser. No. 460,830
Int. Cl. F21l *11/00*
U.S. Cl. 240—10.63 **7 Claims**



1. In combination:

a. a lantern housing enclosing a battery and electrical means connecting the battery and a light producing bulb to energize the bulb upon operation of a switch;

b. a bezel removably mounted on said lantern housing and having a reflector and a lens hermetically sealed therein;

c. a surface defining an elongated passage through the reflector and coaxial therewith;

d. an elongated bulb holding housing removably mounted in sealing engagement within said guide passage and coaxial with the reflector and having a forward end;

e. means on the forward end of said bulb holding housing for mounting a light producing bulb therein with the bulb extending therefrom;

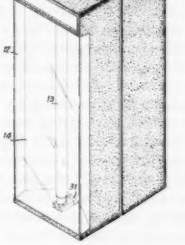
f. means on said bulb holding housing and in said guide passage to mount said bulb holding housing within said passage and to maintain a bulb in said bulb holding housing at a selected location relative to the reflector and having cooperating means operative to effect adjustment of the longitudinal position of the bulb along the axis of the reflector relative to a focal point thereof to thereby adjust the focus of the bulb; and

g. means removably mounted on the forward end of said bulb holding housing and surrounding at least one portion of the bulb mounted therein for imparting a selected color to at least one portion of light produced by said bulb and reflector.

3,875,398
PORTABLE FLUORESCENT LANTERN

Robert E. Brindley, New York, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 285,232, Aug. 31, 1972,. This application Feb. 8, 1974, Ser. No. 440,797
Int. Cl. F21l *7/00*
U.S. Cl. 240—10.63 **10 Claims**



7. A portable fluorescent lantern comprising, in combination:

a. a first rectangular molded plastic casing having top and bottom walls and an open forward and rearward end;

b. a second rectangular molded plastic casing having top and bottom walls, an open forward end and a closed rearward end, said first and second casings being complementary in both size and shape and being normally joined together with the forward end of said second casing facing the rearward end of said first casing, said first and second casings having openings in the top walls thereof adjacent to the open rearward end of said first casing and to the open forward end of said second casing respectively, said openings being coincident when said first and second casings are normally joined together;

c. a fluorescent lamp;

d. a rectangular parabolic reflector mounted inside said first casing, said fluorescent lamp being positioned in front of said reflector;

e. a rectangular molded plastic transparent lens mounted within the open forward end of said first casing;

f. a rectangular molded plastic basal structure mounted within the open rearward end of said first casing, said basal structure including a rear wall which covers the open rearward end of said first casing and a pair of wall members which lie in a plane substantially perpendicular

to said rear wall at opposite ends thereof and which protrude within said first casing in close proximity to the top and bottom walls of said first casing;

g. a pair of lamp holders one of each of which is mounted on one of said pair of wall members for holding said fluorescent lamp in front of said reflector;

h. switch means mounted on one of said wall members and extending through said opening in the top wall of said first casing;

i. a ballast transformer for starting said fluorescent lamp mounted on the rear wall of said basal structure within said first casing;

j. a rectangular molded plastic insert structure mounted within the uppermost portion of said second casing, said insert structure including a front wall, a top wall and a bottom partition member, said top wall and bottom partition member lying in a plane substantially perpendicular to said front wall at opposite ends thereof, said top wall protruding within said second casing in close proximity to the top wall of said second casing, said bottom wall defining a separate compartment within the lowermost portion of said second casing for containing a battery;

k. a cover overlying said separate compartment for said battery;

l. a slidable latch mounted in the top wall of said insert structure and extending through said opening in the top wall of said second casing, said latch being adapted to detachably join said first and second casings together whereby said lantern may be operated with said first and second casings being joined in one assemblage or detached from one another with one of said casings being placed at a location remote from the other casing;

m. an electrical cord in said first casing connected at one end in series with said fluorescent lamp, switch means and said ballast transformer and having at the other end an electrical plug adapted for connection with an AC power supply receptacle for operating said fluorescent lamp therefrom, said electrical cord extending through an opening in the rear wall of said basal structure;

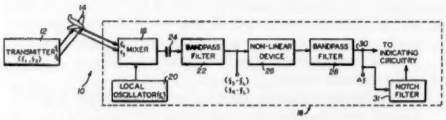
n. an electrical receptacle mounted in the front wall of said insert structure and adapted to receive said electrical plug for operating said fluorescent lamp from said battery in said second casing when said first and second casings are joined together or detached from one another with one casing placed in a location remote from the other; and

o. means for making electrical connection between said electrical receptacle and said battery in said second casing.

3,875,399
MULTI-FREQUENCY OPTIMUM HETERODYNE SYSTEM

Malvin Carl Teich, Woodmere, N.Y., assignor to Research Corporation, New York, N.Y.

Continuation of Ser. No. 69,718, Sept. 4, 1972,. This application Oct. 18, 1973, Ser. No. 407,603
Int. Cl. H04b *9/00*
U.S. Cl. 250—199 **22 Claims**

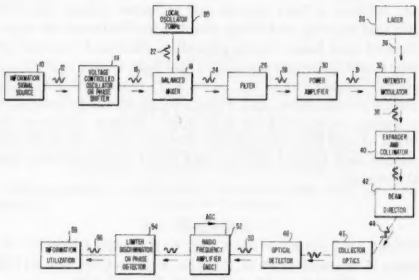


1. A transmission system comprising transmission means for transmitting first and second frequency signals separated by a difference frequency to a moving target whereby said first and second frequency signals may be received as respective third and fourth frequency signals which differ in frequency from said first and second frequency signals because of the Doppler effect but which are separated by substantially said difference frequency, and receiving means for receiving said third and fourth frequency signals, said receiving means comprising local signal generation means for generating a local signal at a nonvaried fifth frequency, mixing means for mixing said third and fourth frequency signals with said fifth frequency signal to produce a plurality of mixed signals including signals which are separated by substantially said difference frequency, filter means connected to said mixing means for passing preselected ones of said plurality of mixed signals which are separated by substantially said difference frequency, and detecting means responsive to said preselected ones of said mixed signals for producing an output signal having a frequency related to said difference frequency.

3,875,400
INTENSITY MODULATED OPTICAL CARRIER COMMUNICATION SYSTEM

Yoh-han Pao, 2721 Scarborough Rd., Cleveland Heights, Ohio 44106; Jonathan P. Freeman, 3855 Mells Rd., Dorset, Ohio 44032, and John W. Allen, 1815 Garfield Rd. No. 303B, E. Cleveland, Ohio 44112

Continuation-in-part of Ser. No. 131,616, April 6, 1971, abandoned. This application Sept. 6, 1973, Ser. No. 394,884
Int. Cl. H04b *9/00*
U.S. Cl. 250—199 **12 Claims**



1. An optical information transmission system comprising:

a. an information signal source;

b. a radio frequency signal source producing a subcarrier signal having a frequency below the microwave range;

c. means responsive to the information signal and to the subcarrier signal for angle modulating the subcarrier with the information signal;

d. a light beam source;

e. intensity modulator means responsive to the light beam and to the modulated subcarrier signal for intensity modulating the light beam in accordance with the modulated subcarrier signal, said modulator means including an electro-optic crystal;

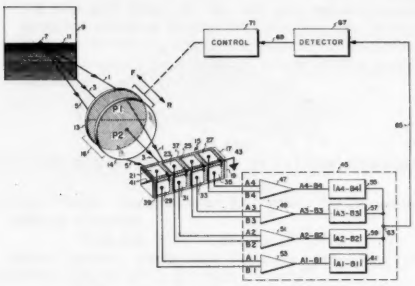
f. means for transmitting the intensity modulated light beam through a medium; and

g. bias control means connected to said electro-optical crystal for providing small signal proportional control to the operating bias of the crystal and, when the control voltage reaches a maximum value, for reversing the polarity of the operating bias at the crystal.

3,875,401
FOCUS DETECTING APPARATUS

Norman L. Stauffer, Englewood, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed July 9, 1973, Ser. No. 377,810
Int. Cl. G07j *1/20*
U.S. Cl. 250—201 **15 Claims**

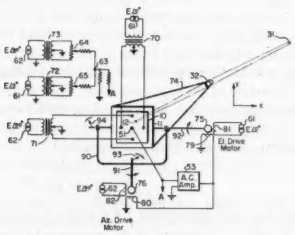


9. The focus detecting apparatus as set forth in claim **8** wherein said first and second sensor arrays are coplanar and parallel to each other.

3,875,402
PHOTOSENSITIVE TRACKING DEVICE WITH A.C. READOUT OF POSITION OF IMAGE ON SPECIAL PHOTOCELL

William J. Parkin, Natick, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jan. 23, 1963, Ser. No. 253,503
Int. Cl. G01j *1/20*
U.S. Cl. 250—203 R **7 Claims**

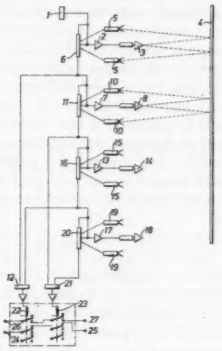


1. Radiant energy sensing apparatus comprising:
a radiant energy responsive photoconductive element having a surface,
a plurality of electrical contacts making electrical ohmic connection with said element in mutually spaced relation on said element,
a plurality of out-of-phase sources of alternating current, each of said plurality of sources being simultaneously connected to and energizing a different pair of said contacts, said pairs of contacts being oriented along non-parallel lines in relation to each other,
a sensing contact being one of said plurality of contacts, said sensing contact being disposed within the region bounded by the contacts of said pairs,
an output terminal connected to said sensing contact to provide a plurality of out-of-phase continuous output signals of alternating current,
means for separating said plurality of continuous output signals to provide a separate continuous output signal corresponding to each out-of-phase source, the phase and amplitude of each separate output signal relative its corresponding source being indicative of the position of impinging radiant energy on the surface of said element.

3,875,403
LIGHT BEAM APPARATUS

Lars Erik Svensson, Ornbergsvagen 5, 146 00 Tullinge, Sweden

Filed Feb. 27, 1974, Ser. No. 446,423
Claims priority, application Sweden, Feb. 27, 1973, 27575/73
Int. Cl. G06m *7/8;* **G08b** *13/00;* **H01h** *47/24*
U.S. Cl. 250—209 **7 Claims**

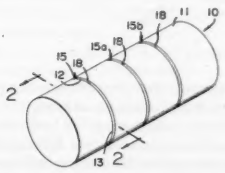


1. A light curtain apparatus for supervising and/or operation of machines, comprising a series of electrical light sources (**3**) arranged to give, through a periodic pulse source (**1**) light pulses which are short in relation to the repetition frequency of the pulse source, said light pulses after having spanned the opening in the light curtain being detected by one or more light pulse detectors (**5**) arranged for each light source (**3**), wherein the light detectors (**5**) for each light source control a pulse control circuit (**6**) which, on receiving essentially simultaneous pulses on its inputs, releases a starting pulse for the light source (**7**) next in sequence in the series, and simultaneously gives a supervisory circuit (**12**) an acknowledgement pulse.

3,875,404
WIDE ANGLE SUN SENSOR

James C. Fletcher, Administrator of the National Aeronautics and Space Administration with respect to an invention of, and Larry L. Schumacher, Newhall, Calif.

Filed Dec. 28, 1973, Ser. No. 429,437
Int. Cl. H01j *35/12*
U.S. Cl. 250—211 R **7 Claims**



1. A single-axis sun sensor comprising:
a cylindrically shaped electrically insulating support member;

at least a first pair of photosensitive detectors supported on the outer surface of said member on opposite sides thereof, with respect to an imaginary plane bisecting said member into two equal parts along its length and extending through the member's longitudinal axis, each detector having first and second opposite ends;

first means for connecting said first ends of said detectors to form a first terminal;

second means including a D.C. potential source having first and second source terminals at $+V_R$ and $-V_R$ volts respectively, with respect to a D.C. reference potential;

said first pair of detectors comprising first and second detectors which are strip-shaped of equal lengths between their ends and of constant width in a direction parallel to said longitudinal axis and are deposited on said outer surface in a circular pattern in a plane perpendicular to the member's longitudinal axis, each detector substantially defining a semicircle on either side of said imaginary plane and said second means further coupling the second ends of said first and second detectors to said first and second source terminals respectively, whereby the amplitude of the D.C. potential at said first terminal is a function of the angle between the direction of solar radiation and said imaginary plane and the polarity of said D.C. potential with respect to said reference D.C. potential is indicative of radiation direction with respect to said imaginary plane.

3,875,405

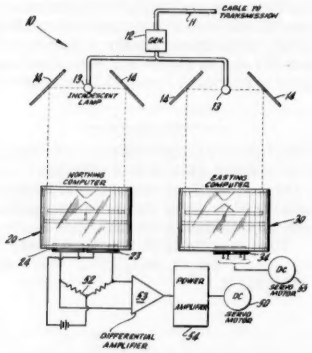
NOVEL NAVIGATIONAL COMPUTER AND MAP TRACKING DRIVE

Dennis Ferguson, 170 Evergreen Rd., Edison, N.J. 00817

Continuation-in-part of Ser. No. 280,592, Aug. 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 26,891, April 9, 1970, abandoned. This application Feb. 22, 1974, Ser. No. 444,811

Int. Cl. G01d *5/34*; **G06f** *15/50*; **G06g** *7/70*

U.S. Cl. 250—211 R **22 Claims**



1. A navigational computer comprising a housing including a rotatable north-seeking indicator, at least one light source, at least two light sensitive means, said at least one light source adapted to illuminate said at least two light sensitive means; means associated with said north-seeking indicator to occlude and expose during rotation said light sensitive means as said housing moves about said north-seeking indicator in proportion to a series of non-linear angle functions corresponding to directional headings, and said light sensitive means in fixed position.

3,875,406

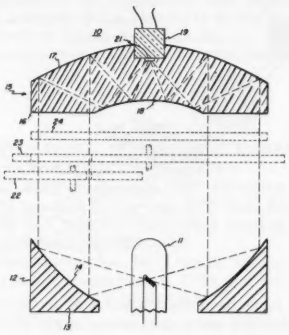
OPTICAL SYSTEM FOR AUTOMATIC METER READER

John M. Holeman, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 348,745, April 6, 1973, abandoned. This application Mar. 25, 1974, Ser. No. 454,410

Int. Cl. G01d *5/34*

U.S. Cl. 250—231 SE **7 Claims**



1. An improved stationary optical system for remote meter readers having a plurality of rotating aperture discs and a rotating scanning disc for scanning portions of said aperture discs comprising:

an incandescent light source having a filament producing divergent light rays;

collimating optics for collimating said divergent light rays and producing a beam of parallel light rays, said beam directed by said collimating optics through the apertures in said discs;

collecting optics positioned to receive the light beam passing through said apertures from said collimating optics, said collecting optics comprising at least two reflectors for receiving said light beam and directing said light beam along a folded beam path to a focus to form an image of the filament of said incandescent light source; and

photodetector means, positioned at said focus, having an active area for converting the light passing through said apertures into an electrical signal.

3,875,407

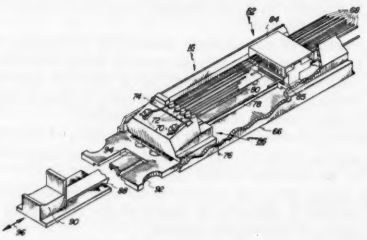
CORONA GENERATOR CLEANING APPARATUS

Thomas F. Hayne, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 16, 1974, Ser. No. 433,979

Int. Cl. H01j *37/26*

U.S. Cl. 250—324 **14 Claims**



1. A corona generating apparatus, including:

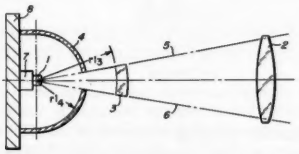
a shield defining an elongated open ended chamber;
grid means disposed in the open end of said shield extending substantially in a longitudinal direction along the length of said shield;
electrode means interposed between said shield and said grid means; and
means for cleaning said electrode means and said grid means, said cleaning means having a first portion engaging said grid means to flex said grid means loosening particles adhering thereto and scraping the loosened particles therefrom, said cleaning means having a second portion engaging said electrode means to wipe particles therefrom.

3,875,408

METHOD AND DEVICE FOR ASCERTAINING THERMAL CONSTRASTS

Gunter Pusch, Bannholzweg 12, 6903 Neckargemund-Dilsberg, Germany

Filed July 9, 1973, Ser. No. 377,710
Claims priority, application Germany, July 10, 1972, 2233870; July 10, 1972, 2233820
Int. Cl. G01j *3/28*
U.S. Cl. 250—339 **14 Claims**



1. A method of ascertaining thermal contrasts, which includes
a. the step of limiting the reception of thermal radiation to the through-passage region of an atmospheric window from 3.0 to 4.2 μm wavelength and thereby excluding the disturbing radiation of the absorbing gases (CO_2 and H_2O) from being received,
b. the further step of using a detector whose sensitivity has its maximum in that atmospheric window.

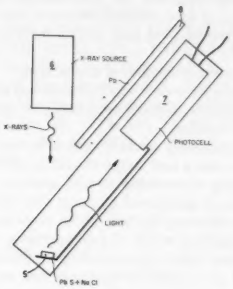
3,875,409

DEVICE FOR CONVERTING AN INPUT QUANTITY OF ONE KIND INTO AN OUTPUT QUANTITY OF ANOTHER KIND

Jaap Van Suchtelen; Adrianus M. J. G. Van Rien, and Leonardus A. H. Van Hoot, all of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 296,052, Oct. 10, 1972, abandoned. This application Sept. 24, 1973, Ser. No. 399,868
Claims priority, application Netherlands, Oct. 11, 1971, 7113960
Int. Cl. G01t *1/10*
U.S. Cl. 250—370 **7 Claims**

1. A device for converting a first physical quantity X into a second physical quantity Z comprising a body of a composite material consisting of a heterogenous mixture of at least two phases derived from a single homogeneous phase, one of said phases having the property of producing a third quantity Y in response to the quantity X and another of said phases having the property of producing the physical quantity Z in response to the quantity Y, means to produce the first physical quantity, means to couple said first physical quantity producing means



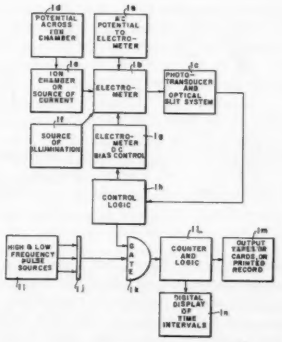
to said body, and means to couple said body to means for reproducing said physical quantity Z.

3,875,410

RADIATION DETECTOR USING A DIGITAL ELECTROMETER SCALER

Paul P. Luger, Seattle, Wash., assignor to The Pioneer Educational Society, Portland, Oreg.

Filed Apr. 28, 1970, Ser. No. 32,578
Int. Cl. G01t *1/14, 1/18*
U.S. Cl. 250—374 **8 Claims**



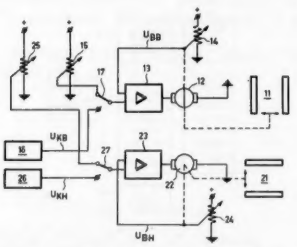
1. In combination, a measuring system, comprising:
a. an electrometer having a movable element or needle, mounted within an electric, alternating current field of force,
b. said field of force capable of producing a vibratory motion of said movable element in response to a first force and to a second force,
c. said first force being due to an electric charge from a direct current source of potential,
d. said second force being due to electric charge flowing to the collecting electrode of an ionization chamber,
e. said collecting electrode being connected to the said movable element of said electrometer,
f. means for applying said first force to said movable element and
g. means for applying said second force to said movable element,
h. said first force due to known quantities, said second force due to quantities under measurement,

i. said first and second force of opposite kinds, capable of annulling the effect of one another when equal in magnitude,
j. monitoring apparatus for determining the condition of movement of said movable element and the time when the said first and the said second force are equal to one another,
k. said monitoring apparatus comprising:
l. an optical system consisting of a source of illumination, a focusing device, a mask containing an aperture of predetermined outline,
m. said illuminating source, optical system and mask arranged to cast a real image of said needle on said mask in overlapping relationship to said aperture,
n. a transducer positioned adjacent said aperture to generate an undulating electric signal responsive to the presence of the real image of said aperture;
o. a recording means for recording the presence of said real image of said needle at said aperture, responsive to said undulating electric signal,
p. means responsive to said undulating signal for recording the effect of said second force.

3,875,411
X-RAY APPARATUS

Heinz-Peter Kunert, Amselweg, Germany, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Aug. 29, 1973, Ser. No. 392,754
Claims priority, application Germany, Sept. 30, 1972, 2248101
Int. Cl. G03b 41/16
U.S. Cl. 250—402 **3 Claims**

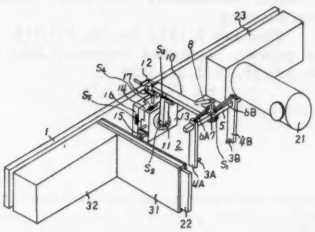


1. In X-ray apparatus having both fluoroscopy and radiography capability and having an adjustable diaphragm controlling the X-ray beam size, apparatus for controlling said adjustable diaphragm and for alerting an operator when the display during fluoroscopy is larger than what would be recorded during radiography, comprising:
a servo system controlling said adjustable diaphragm in accordance with an input signal supplied thereto;
means for producing a first signal which when supplied as said input signal to said servo system causes said servo system to adjust said diaphragm so as to conform the size of the X-ray beam to the size of the radiographic film in said X-ray apparatus;
means for producing a manually variable second signal which when supplied as said input signal to said servo system causes said servo system to adjust said diaphragm to a variable size in accordance with said manually variable second signal;
switching means for supplying as said input signal to said servo system during fluoroscopy said second signal and during radiography said first signal;
comparing means responsive to said first and second signals during fluoroscopy for producing a suitable output signal when the beam size which corresponds to said second signal exceeds the beam size which corresponds to said first signal; and
visual indicating means responsive to said output signal for alerting an operator that the display during fluoroscopy is larger than what would be recorded during radiography.

3,875,412
APPARATUS FOR TAKING AN X-RAY PICTURE OF THE HEAD

Kazuo Hozumi, Kyoto, Japan, assignor to Kabushiki Kaisha Marita Siesakusha, Kyoto, Japan

Filed July 9, 1973, Ser. No. 377,601
Claims priority, application Japan, July 18, 1972, 47-72249
Int. Cl. G03b 41/16
U.S. Cl. 250—491 **6 Claims**

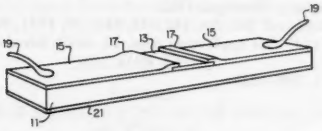


1. A head-position adjusting apparatus suitable for use in combination with an X-ray photographic apparatus, wherein an X-ray beam is transmitted along a substantially horizontal X-ray axis towards an X-ray film intersecting said X-ray axis, to position the head of a person such that it intersects said X-ray axis, X-ray photographic apparatus, said head-position adjusting apparatus comprising:
a support arm adapted to be positioned above said X-ray axis;
a pair of spaced support members mounted on said support arm so as to extend outwardly from said support arm in the general direction of said X-ray axis, and adapted to be moved toward and away from one another along said support arm;
a pair of ear rods, one of said ear rods being affixed to one of said pair of spaced support members and projecting toward the other of said pair of spaced support members, the other of said ear rods being affixed to the other of said pair of spaced support members and projecting toward said one of said pair of spaced support members, said pair of ear rods defining a straight line, and being movable into and out of the ears of the head of a person when said head is suitably positioned between said pair of spaced support members;
ear rod positioning means connected to said pair of spaced support members for simultaneously moving said pair of spaced support members so as to position said pair of ear rods in the ears of the head of a person when said head is suitably positioned between said pair of spaced support members; and
head positioning means connected to said support arm for selectively positioning said straight line connecting said pair of ear rods: (a) longitudinally with respect to said X-ray axis; (b) transversely with respect to said X-ray axis in both vertical and horizontal planes; (c) arcuately with respect to said X-ray axis in a generally vertical plane; and (d) arcuately with respect to said X-ray axis in a generally horizontal plane.

3,875,413
INFRARED RADIATION SOURCE

John A. Bridgham, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 9, 1973, Ser. No. 404,845
Int. Cl. H05b 1/02
U.S. Cl. 250—492 9 Claims

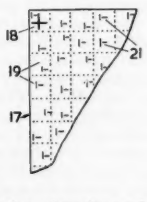


1. An infrared radiation source comprising:
a substrate;
a pair of metal strips of emissivity less than about 0.2 in the infrared region positioned on one side of the substrate;
a thin film resistive heater of emissivity greater than about 0.5 in the infrared region positioned on the substrate in between the pair of metal strips to serve as a radiation source area bounded by the metal strips; and
input and output leads electrically interconnected with the pair of metal strips for conducting an electrical current through the source.

3,875,414
METHODS SUITABLE FOR USE IN OR IN CONNECTION WITH THE PRODUCTION OF MICROELECTRONIC DEVICES

Arthur Cunningham Prior, Malvern, England, assignor to The Secretary of State for Defense in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Aug. 20, 1973, Ser. No. 389,551
Int. Cl. H01j 37/00
U.S. Cl. 250—492 9 Claims

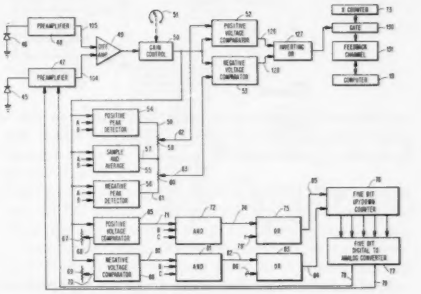


1. In method for producing microelectronic devices wherein an electron beam which is accurately deflectable over a limited field forms a predetermined pattern in a layer of organic resist material on a substrate and wherein portions of the layer of resist material are selectively removed to form a corresponding pattern for the purpose of processing the substrate, the method of registering the microelectronic device comprising the step of:
providing on the layer of resist material a plurality of alignment marks so located on the layer that when the layer is in a desired position for exposure by the electron beam there is at least one alignment mark among the plurality of alignment marks in the field of accurate deflection of the electron beam,
aligning the electron beam by reference to each of said alignment marks by detecting the secondary electron emission image produced from the electron beam at at least one edge of an alignment mark, and
selectively scanning the electron beam across the layer in the field of accurate deflection of the electron beam to draw the predetermined pattern, the position of the pattern having a predetermined fixed spatial relationship to said alignment mark.

3,875,415
METHOD AND APPARATUS FOR DETECTING A REGISTRATION MARK ON A TARGET SUCH AS A SEMICONDUCTOR WAFER

Ollie C. Woodard, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 28, 1974, Ser. No. 437,434
Int. Cl. H01j 37/00
U.S. Cl. 250—492 15 Claims



1. An apparatus for determining the location of a registration mark on a target including:
means to sense the beginning of the registration mark and the end of the registration mark when the registration mark is scanned by a beam of charged particles;
said sensing means including means to produce a first peak electrical signal at the beginning of the registration mark and a second peak electrical signal at the end of the registration mark with the two peak electrical signals being of opposite polarity;
first means to produce a first threshold signal correlated to the first peak electrical signal and to a signal baseline voltage determined by the surface of the target in the area having the registration mark;
second means to produce a second threshold signal correlated to the second peak electrical signal and to a signal baseline voltage determined by the surface of the target in the area having the registration mark;
third means to produce a first signal when the first peak electrical signal crosses the first threshold signal;
fourth means to produce a second signal when the second peak electrical signal crosses the second threshold signal; and means to determine the positions of the beginning and end of the registration mark in accordance with the positions of the beam when the first and second signals are produced.

3,875,416
METHODS AND APPARATUS FOR THE PRODUCTION OF SEMICONDUCTOR DEVICES BY ELECTRON-BEAM PATTERNING AND DEVICES PRODUCED THEREBY

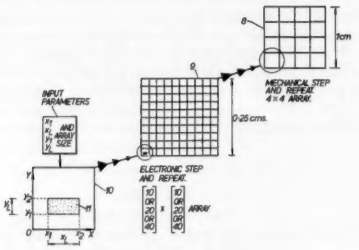
Denis Frank Spicer, Putnoe, England, assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 51,257, June 30, 1970, abandoned.
This application Feb. 11, 1974, Ser. No. 440,947
Int. Cl. H01l 7/00; H01j 37/26; B01j 17/00
U.S. Cl. 250—492 A 5 Claims

1. A method for selectively exposing an electron bombardment sensitive material on a substrate surface using an electron beam apparatus having a predetermined optical field, wherein said sensitive material includes a plurality of areas respectively corresponding to said optical field of said electron beam apparatus, and means for stepping said electron

beam to successively expose said plurality of areas such that each exposed area is aligned relative to a reference pattern, including the steps of:

1. forming adjacent a surface of said electron beam sensitive material an alignment marker pattern associated with said areas and corresponding to said reference pattern,
2. sequentially step scanning in a uninterrupted sequence the said alignment pattern associated with a selected one of said areas to generate data signals corresponding to said alignment marker pattern and indicating positional errors of said alignment marker pattern relative to said reference alignment pattern,



3. adjusting the relative positions of the scanning path of said electron beam and said substrate in response to said data signals to precisely align said alignment marker pattern and said reference alignment pattern,
4. and then without moving said substrate step scanning said electron beam over selected portions of predetermined sub-areas within said aligned one area in an uninterrupted sequence to selectively expose said portions in each sub-area whereby said exposed portions of said sub-areas have precisely predetermined positional relationships relative to said reference alignment pattern.

3,875,417

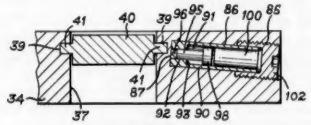
NUCLEONIC MEASURING APPARATUS

Bernard C. Holben, Dublin, and Richard E. Bach, Hilliard, both of Ohio, assignors to Industrial Nucleonics Corporation, Columbus, Ohio

Continuation of Ser. No. 634,364, April 27, 1967, abandoned. This application Feb. 26, 1970, Ser. No. 14,774

Int. Cl. G21f *5/04*

U.S. Cl. 250—506 **8 Claims**



1. A nucleonic radiation measuring instrument comprising a housing enclosing a source of nuclear radiation and having an aperture for releasing radiation from said housing for measurement purposes, a shutter for said aperture, means supporting said shutter for movement between an open position in relation to said aperture and a closed position effectively confining the radiation within said housing, biasing means urging said shutter to said closed position, motor means for moving said shutter from said closed position to said open position, means responsive to the occurrence of a predetermined high ambient temperature for deenergizing said motor means so that said bias means moves said shutter from said open position to said closed position, and means automatically operated when said shutter has been closed in response to said high temperature for locking said shutter in said closed position.

3,875,418

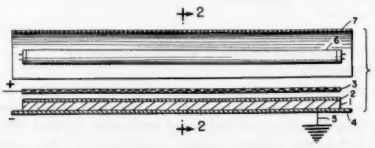
APPARATUS FOR CURING PHOTOPOLYMERIZABLE FILM FORMING POLYMER COATINGS

Carl J. Warneke, deceased, late of Chicago, Ill. (by Mabel P. Warneke, administratrix), assignor to The Sherwin-William Company, Cleveland, Ohio

Division of Ser. No. 148,024, May 28, 1971, Pat. No. 3,725,114. This application Sept. 28, 1972, Ser. No. 292,850

Int. Cl. B01k *1/00*

U.S. Cl. 250—527 **5 Claims**



1. An apparatus for curing a film-forming coating of a photopolymerizable resin on a substrate which comprises a light source capable of emitting and directing light waves having wave lengths within the range of 1,850 to 4,000 angstroms on to the surface of a coated substrate coated with a coating of a film-forming photopolymerizable resin, and means for providing an electrostatic field at the surface of said coating of sufficient intensity to increase the rate of curing.

3,875,419

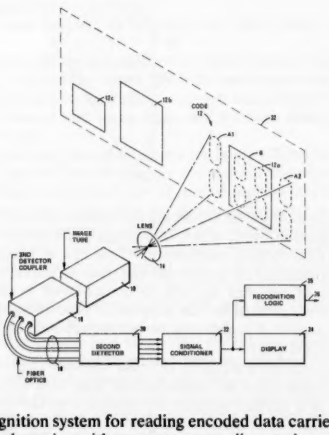
ELECTRO-OPTICAL READER

A. D. Harms, Jr., Winona, Tex., assignor to E-Systems, Inc., Dallas, Tex.

Filed June 1, 1973, Ser. No. 366,114

Int. Cl. G01n *21/30*

U.S. Cl. 250—568 **20 Claims**



1. A recognition system for reading encoded data carried by an object and moving with respect to a reading station along a travel path, comprising in combination:

first means for receiving energy reflected from the encoded data to provide a first background image area from a first zone at the reading station, a code image area from a second zone at the reading station juxtapositioned the first zone, and a second background image area from a third zone at the reading station juxtapositioned the second reading zone;

second means for deflecting energy reflected from the encoded data at the three zones of the reading station to said first means;

third means coupled to said first means and responsive to the three image areas of the encoded data to generate electrical signals related to each of the image areas; and fourth means connected to receive the electrical signals for each of the image areas for a comparison of the electrical signals from the background image areas with the electrical signals from the code image area to generate a series of code related pulses representing the object carried encoded data.

3,875,420
DEVICE FOR MEASUREMENT OF THE DISPLACEMENT OF A TOOTH

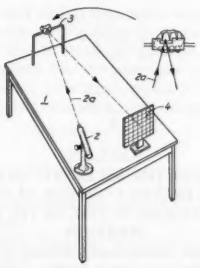
Hans Ryden; Hans Ingmar Bjelkhagen, Sweden, and Nils H. L. Abramson, all of Stockholm, Sweden, assignors to said Bjelkhagen and said Abramson to said Ryden, Stockholm, Sweden

Filed Sept. 24, 1973, Ser. No. 400,166

Claims priority, application Sweden, Sept. 25, 1972, 12322/72

Int. Cl. G02f *1/28*

U.S. Cl. 250—578 **6 Claims**



1. Device for measuring the displacement of a tooth in a jawbone by comparing the position of a beam of light reflected from said tooth at a first measurement with the position of said reflected beam at a second measurement, comprising a fixture for locating a jawbone in a predetermined position for successive measurements of said tooth position, light source positioned at a location having a predetermined angular relationship to said fixture, means for directing a beam of light from said light source onto the surface of a tooth whose displacement is to be measured while the jawbone is positioned by said fixture, and a fixed medium for directly receiving the light patterns reflected by the surface of said tooth from siad light source during said successive measurements and for comparing the respective positions of said light patterns as a function of displacement of the tooth.

3,875,421
BICYCLE LIGHT SYSTEM

David S. Anshus, New Port Richey, Fla., assignor to Needs, Inc., Tampa, Fla.

Continuation-in-part of Ser. No. 359,837, May 14, 1973,. This application Nov. 9, 1973, Ser. No. 414,462

Int. Cl. B60l *1/14*

U.S. Cl. 307—9 **2 Claims**

1. A bicycle lighting system comprising, in combination:

an alternating current generator adapted to be driven at variable speed by the bicycle,

an electrical light adapted to be mounted on the bicycle,

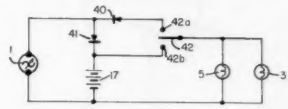
a rechargeable battery,

an electrical connection from one side of the generator to one side of the battery and to one side of the electric light,

a first diode, a first side of which is an anode and a second side of which is a cathode,

one side of said diode being connected to the other side of said alternating current generator and the other side of said diode being connected to the other side of said rechargeable battery, whereby the battery is charged on one half of the cycle of said alternating current generator when the voltage of the alternating current generator exceeds the voltage of the rechargeable battery,

a second diode, a first side of which is an anode and a second side of which is a cathode,



one side of said second diode being connected to said one side of said first diode, said last-named connection being between an anode of one of the diodes and a cathode of the other, and

switching means connected to the other side of said electric light, to the said other side of said first diode, and to the other side of said second diode for selecting between two circuits, one of which places the electric light, the generator and the second diode in series to thus energize said electric light during the other half cycle of said alternating current generator, and the other of which circuits places the rechargeable battery and the electric light in parallel.

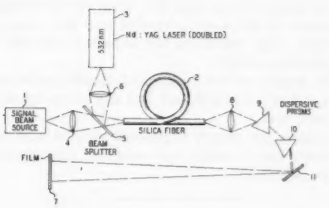
3,875,422
FOUR PHOTON PARAMETRIC AMPLIFICATION IN GLASSY OPTICAL WAVEGUIDES

Rogers Hall Stolen, Rumson, N.J., assignor to Bell Telephone Laboratories Incorporated, Murray Hill, N.J.

Filed July 24, 1974, Ser. No. 491,267

Int. Cl. H03f *7/04*

U.S. Cl. 307—88.3 **9 Claims**



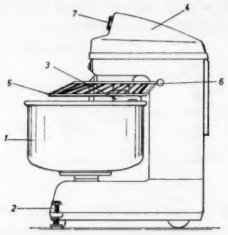
1. An active optical device comprising a glassy optical waveguiding fiber dimensioned to be moderately multi-moded with respect to the intended signal wavelength and the intended pump wavelength, means for launching into said fiber a beam of said signal wavelength in a selected mode, and means for launching into said fiber a beam of said pump wavelength in two modes simultaneously to generate an idler wavelength differing from said pump wavelength in the opposite sense from said signal wavelength.

9. An active optical device comprising a glassy optical waveguiding fiber dimensioned to be moderately multi-moded with respect to the intended pump wavelength, and means for injecting into said fiber a beam of said pump wavelength in two modes simultaneously to generate signal and idler wavelengths differing from said pump wavelength in opposite senses and differing in modes.

3,875,423
KNEADING AND MIXING MACHINE

Kate Kemper, Wybuelstrasse 6, Zurich-Zollikon, Switzerland

Filed Mar. 13, 1973, Ser. No. 340,843
Claims priority, application Germany, Mar. 15, 1972, 2212430
Int. Cl. H01h 47/00
U.S. Cl. 307—113 8 Claims



1. An electrically driven kneading and mixing machine operating in different speed ranges, having a liftable guard grille; means connected to the grille for switching off the machine in any speed range when the grille is lifted; a first push-button switch; means connected to said first push-button switch for driving the machine at a relatively low speed upon actuation of the first push-button switch; a first timer connected to the first push-button switch for determining the operating period of the machine at the relatively low speed; comprising in combination:

a. a second push-button switch connected in series with said first push-button switch and said first timer;

b. means connected to said second push-button switch for driving the machine at a relatively high speed upon actuation of said second push-button switch;

c. a second timer connected to said second push-button switch for determining the operating period of the machine at the relatively high speed, said second timer being connected in series with said first push-button switch and said first timer, said second timer being programmable with the entire work period;

d. means connected to said first timer for switching, upon expiration of the work period of said first timer, to the relatively high speed by the actuation of said second push-button switch;

e. a first toggle switch connected parallel with said first timer and in series with said first and second push-button switches; and

f. a second toggle switch connected parallel with said second timer and in series with said first and second push-button switches.

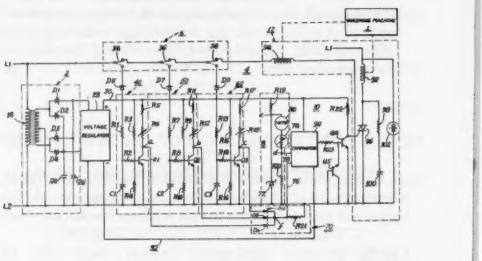
3,875,424
TEMPERATURE CONTROLLER FOR FLUID IN AN APPARATUS HAVING A PLURALITY OF OPERATION CYCLES

Charles L. Hopkins, Norwood, Ohio, assignor to McGraw-Edison Company, Elgin, Ill.

Division of Ser. No. 231,137, March 2, 1972, Pat. No. 3,772,900. This application Aug. 27, 1973, Ser. No. 391,974
Int. Cl. H01h 37/26
U.S. Cl. 307—117 2 Claims

1. A control circuit for controlling the temperature of a fluid in an apparatus having a plurality of operation cycles comprising:

first circuit means comprises a separate signal circuit for each one of said operation cycles, each signal circuit having an output signal condition and producing a predetermined first signal representative of a desired fluid temperature during each one of said operation cycles when in said condition, no more than one of said signal circuits having an output signal condition at any given time, the other signal circuits having a normal signal condition, said first circuit means includes blocking circuit means responsive to the output signal condition of said one of the signal circuits to block the normal signal condition of the other signal circuits;



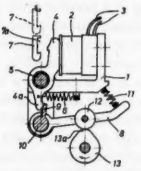
second circuit means for producing a second signal representative of the actual fluid temperature and indicating said actual temperature during each one of said operation cycles; and

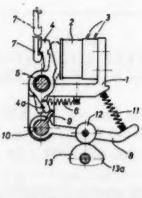
third circuit means connected to said first and second circuit means and being responsive to the first and second signals for comparing the levels of said first and second signals during each one of said operation cycles and producing an actuating signal when the levels of said first and second signals have a predetermined relationship.

3,875,425
APPARATUS FOR THE SELECTIVE HOLDING OF A TO-AND-FRO DRIVEN CONTROL ELEMENT OF A TEXTILE MACHINE IN ONE OF ITS TERMINAL POSITION

Franz Speich, Frick, Switzerland, assignor to IMB Ingenieurburs fur Maschinenbau Jakob Muller, Frick, Switzerland

Filed Dec. 26, 1973, Ser. No. 427,625
Claims priority, application Switzerland, Jan. 10, 1973, 303/73
Int. Cl. H05
U.S. Cl. 307—154 13 Claims





1. An apparatus for selectively fixedly holding a substantially to-and-fro moving and driven control element of a textile machine in one of two of its possible terminal positions, comprising a holding element defined by an armature of a selectively energizable electromagnet, said holding element when the electromagnet is de-energized being movable from a first

position in which it bears against the electromagnet into a second position and wherein in one of its positions said holding element blocks the control element which is located in one terminal position, an actuation mechanism acting upon the holding element for selectively either bringing the holding element from its second position into its first position, lifting-off the holding element which bears against the electromagnet when the electromagnet is de-energized, or carrying out both of such operations.

3,875,426
LOGICALLY CONTROLLED INVERTER

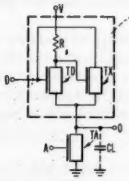
Otz Baitinger, Stuttgart, and Werner Haug, Boeblingen, both of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 15, 1972, Ser. No. 263,017

Claims priority, application Germany, June 26, 1971, 2131939

Int. Cl. H03k *19/08, 19/40, 19/34, 19/36*

U.S. Cl. 307—205 **7 Claims**



1. A logically controlled inverter circuit comprising:
a capacitive load;
a first field effect transistor connected in series with said capacitive load;
a second field effect transistor connected in parallel with said capacitive load, thereby charging and discharging said capacitive load via said first and second field effect transistor, respectively, by applying suitable gate potentials;
a resistive means connected between said first field effect transistor and a source of potential supply; and
a third field effect transistor connected in series with said capacitive load, and having a gate electrically connected to a point between said resistive means and said first field effect transistor, thereby rendering said third field effect transistor conductive and applying a defined potential to the capacitive load when said first field effect transistor is inhibited;
wherein said third field effect transistor applies the potential at the gate of the first field effect transistor to the capacitive load.

3,875,427
SWEEP GENERATOR CIRCUIT FOR AN ELECTRONIC APPARATUS WHICH PRODUCES A SWEEP SIGNAL HAVING A SWEEP RATE PROGRAMMED BY THE SETTINGS OF A SELECTED PLURALITY OF CONTROLS OF THE ELECTRONIC APPARATUS

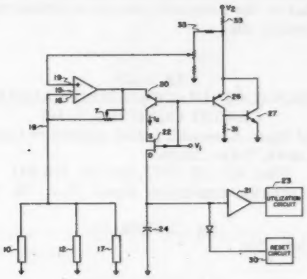
Russell B. Riley, Portola Valley, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 10, 1973, Ser. No. 423,341

Int. Cl. H03k *4/08;* **G06g** *7/24*

U.S. Cl. 307—228 **8 Claims**

1. A sweep generator circuit, adapted to respond to a plurality of input quantities, comprising:
current source means for producing currents proportional to the logarithms of each of the input quantities:
summation means connected to the current source means for producing a voltage proportional to the sum of the currents from the current source means;



exponentiating means connected to the summation means for producing a current proportional to the anti-logarithm of the voltage produced by the summation means; and
charge storage means connected to the exponentiating means for producing a sweep voltage in response to the current produced by the exponentiating means.

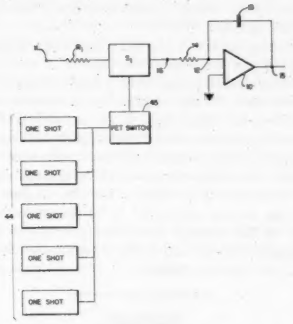
3,875,428
ARRANGEMENT FOR SELECTIVELY DETERMINING RATE OF INTEGRATION OF AN APPLIED OSCILLATORY SIGNAL BY SELECTING THE PROPORTION OF EACH SIGNAL CYCLE DURING WHICH INTEGRATION TAKES PLACE

Richard E. Le Blanc, Orange, and Bernard F. Delettrez, Whittier, both of Calif., assignors to Beckman Instruments Inc., Fullerton, Calif.

Filed Dec. 10, 1973, Ser. No. 423,074

Int. Cl. G06g *7/12;* **H03k** *17/00*

U.S. Cl. 307—229 **2 Claims**



1. The method of selecting integration rate in integrating an electrical wave of input signal which comprises the steps of:
chopping the wave at a fixed frequency,
applying the chopped wave input signal to an integrating circuit,
disconnecting the input signal during a portion of each cycle of the wave by interposing a pulse controlled switch,
providing pulse generators of the same frequency as the wave applied to the recorder but of different pulse lengths for controlling the interposed switch
selecting the pulse generator controlling the interposed switch according to its pulse length in relation to the strength of the input signal, selecting a pulse generator of greater pulse length for a weaker input signal and a pulse

generator of shorter pulse length for a stronger input signal

and thereby adjusting the relative time duration of such application per chopping cycle that the electrical wave is applied to the integrating circuit to obtain the desired integration rate.

3,875,429

PULSE SIGNAL GENERATING CIRCUIT AND CONTROL CIRCUIT USING THE SAME

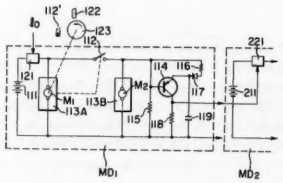
Mitsutoshi Ogiso, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 15, 1972, Ser. No. 306,841

Claims priority, application Japan, Nov. 18, 1971, 46-108045

Int. Cl. H03k *3/57*

U.S. Cl. 307—246 **5 Claims**



1. A control circuit for continuously and sequentially actuating at least three controlled devices,

the control circuit comprising, at least two control units (MD1, MD2) serially connected, each of which control unit corresponds to one of said controlled devices and provides a trigger signal for the next succeeding one at an output upon completion of the actuation of one of said controlled devices,

each of said control units comprising:

a. a power source (**111**);

b. driving means (**113A, 113B**) connected to said power source for driving a corresponding one of said controlled devices;

c. switching means (**121, 112**) for controlling turning on and off said driving means; and

d. semiconductor switching circuit means connected across said driving means for generating the trigger signal upon completion of the actuation of the corresponding one of said controlled devices, said semiconductor switching circuit means comprising a semiconductor switching element (**114**), resistor means (**118**) for establishing a voltage for the trigger signal and storage means connected to be charged upon application of the voltage from said power source and discharged through said semiconductor switching element and said resistor means.

3,875,430

CURRENT SOURCE BIASING CIRCUIT

Jan Willem L. Prak, Cupertino, Calif., assignor to Intersil, Inc., Cupertino, Calif.

Filed July 16, 1973, Ser. No. 379,351

Int. Cl. H03k *1/02, 1/12*

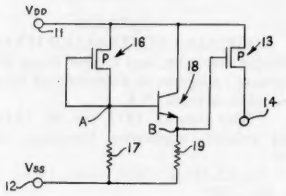
U.S. Cl. 307—297 **8 Claims**

8. An integrated circuit MOS stable current source having first and second opposite polarity voltage supply terminals adapted for connection across a low voltage supply having an output subject to variation comprising:

a first MOSFET device connected at source and drain between said first voltage supply terminal and a current output terminal,

a second MOSFET device having substantially the same threshold voltage as said first MOSFET device connected at source and drain in series with a resistance between said first and second voltage supply terminals and having the gate thereof connected to the juncture of device and resistance, with said device being biased by said resistance to conduct in the exponential part of the device characteristic,

said first and second devices having substantially the same threshold voltages, and



a single semiconductor junction connected between the gate of said first device and the gate of said second device,

whereby the gate voltage of said first device is substantially equal to the threshold voltage of the second device minus the semiconductor junction voltage to provide a stable output current at said output terminal having little dependency upon device threshold voltages.

3,875,431

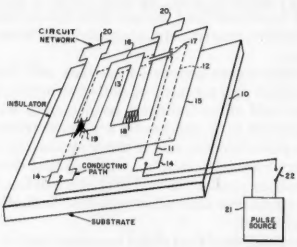
DESTRUCTIBLE MICROELECTRONIC CIRCUIT ELEMENT

Edward J. Kapp, San Pedro, Calif., assignor to The United States of America as represented by the secretary of the Navy, Washington, D.C.

Filed Oct. 16, 1970, Ser. No. 81,625

Int. Cl. H03k *19/168*

U.S. Cl. 307—298 **2 Claims**



1. A self-destruct microelectronic thin film circuit module comprising:

a thin film circuit substrate of ceramic type material;

a conducting film conductor of an exothermic mixture of aluminum-palladium evaporated on said substrate to underlie a thin film circuit at strategic places of destruction;

a thin film of electrical insulating material of silicon monoxide evaporated on said substrate overlying said conducting film conductor;

a thin film circuit deposited over said silicon monoxide film with strategic portions overlying said conducting film; and

a switched pulsing circuit coupled to said conducting film whereby upon closing the switch the energy pulses energize said conducting film to produce exothermic reaction to destroy said thin film circuit at said strategic places.

3,875,432

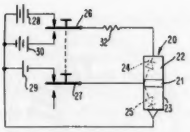
TIMED SWITCH CIRCUITS UTILIZING MINORITY CARRIER INJECTION IN A SEMICONDUCTOR DEVICE

Jerry Saia, Kingston, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 32,503, April 14, 1970, Pat. No. 3,696,285, which is a division of Ser. No. 586,775, Oct. 14, 1966, Pat. No. 3,609,410. This application Oct. 21, 1971, Ser. No. 188,430

Int. Cl. H03k 3/26, 19/08

U.S. Cl. 307—299 5 Claims



1. A switching type circuit comprising

a semiconductor device having at least base, collector and emitter regions,

the thickness of said base region being small compared to the minority carrier diffusion length therein,

said collector region having substantial minority carrier storage capability,

means for injecting minority carriers from said base into said collector region to achieve substantial charge storage in the latter, and

means for applying a potential across said collector and emitter regions for effecting current flow between said collector and emitter regions as a result of the presence of said charge from said minority carriers,

said last recited means having circuit parameters such that carrier depletion is the dominant factor in termination of said current,

whereby the collector-emitter current flow will be proportioned to the minority carrier injection charge,

which includes

trigger means for initiating operation of said minority carrier injection means, and

means for causing said potential applying means to be effective subsequent to actuating of said triggering means for providing forward collector-emitter current flow.

3,875,433

CIRCUIT CONTROLLING SYSTEM

Shoji Uchikawa, Iwaki, Japan, assignor to Kureba Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 125,791, March 18, 1971, abandoned. This application Sept. 27, 1973, Ser. No. 401,296

Claims priority, application Japan, Mar. 19, 1970, 45-22660

Int. Cl. G08b 13/26; H01g 7/02; H04r 19/00

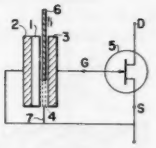
U.S. Cl. 307—308 9 Claims

1. A method for controlling an electric circuit including a field effect transistor, an electret and an induction electrode, comprising the steps of;

coupling said induction electrode in an operable relationship to said field effect transistor;

positioning said electret in spaced relation to said induction electrode such that said electret and induction electrode are electrostatically coupled, and

selectively moving an electric field shielding plate into and out of the space between said electret and said induction



electrodes to control the operating state of said field effect transistor.

3,875,434

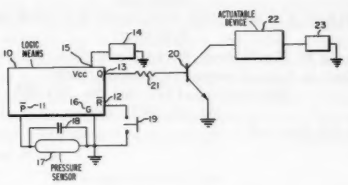
PRESSURE-SENSITIVE SENSOR/LOGIC ASSEMBLY

John Charles Harden, Wilmington; John Lawrence Knupp, Jr., Newark, and Sebastian Vito Rocco Mastrangelo, Hockessin, all of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 31, 1973, Ser. No. 411,427

Int. Cl. H03k 17/00

U.S. Cl. 307—308 21 Claims



1. An electrically operated sensor/logic assembly for actuating a device, the assembly comprising, in cooperation,

i. as sensor, a pressure-sensitive, non-ohmic elastic resistor comprising a continuous, elastomeric material having metallic-conductive particles distributed therein in sufficient volume ratio to impart to said resistor a monitorable standby resistance above a threshold value and a capability for resistance reduction below a threshold value upon application of a preselected degree of pressure, the monitorable standby resistance value being between 50,000 ohms and 10 megohms, said threshold resistance value being discriminated by

ii. a logic means connected thereto and adapted to provide a device-actuating signal upon reduction of sensor resistance below the threshold value.

3,875,435

HEAT OPERATED CRYOGENIC ELECTRICAL GENERATOR

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Taylor G. Wang, Glendale; Melvin M. Saffren, Altadena, and Daniel D. Elleman, La Canada, all of Calif.

Filed Apr. 1, 1974, Ser. No. 457,295

Int. Cl. H02k 9/00

U.S. Cl. 310—40 18 Claims

1. An electrical generator comprising:

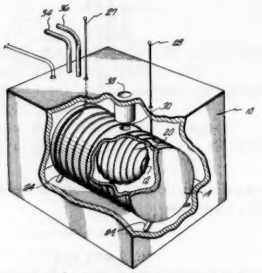
cell means;

means for rotatably mounting the cell means;

liquid helium disposed within the cell means, the cell means being arranged to prevent rotation of liquid helium in its normal state relative to the cell means and to permit

rotation of liquid helium in its superfluid state relative to the cell means;

magnetic means for providing a magnetic field which rotates with the cell means;



at least one electrical conductor positioned in the proximity of the cell means for intercepting lines of force provided by the magnetic means when the cell means is rotated; and

means for alternately converting liquid helium from the normal to the superfluid state and vice versa.

3,875,436

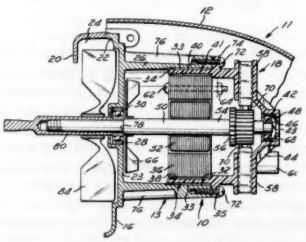
DOUBLE INSULATED VACUUM CLEANER MOTOR HOUSING

Charles H. MacFarland, Rocky River, Ohio, assignor to The Scott & Fetzer Company, Cleveland, Ohio

Filed July 16, 1973, Ser. No. 379,405

Int. Cl. H02k 7/14

U.S. Cl. 310—43 **6 Claims**



1. A vacuum cleaner comprising a metal housing assembly providing a bearing support wall extending radially inward to a first bearing support portion, a fan shroud adjacent one side of said bearing support wall and an extension having generally cylindrical inner wall portion extending from said bearing support wall on the other side thereof; a unitary non-conducting motor housing having a cylindrical portion telescoping into said cylindrical inner wall portion and being laterally supported thereby, said motor housing providing a central portion adjacent said cylindrical portion having brush holders therein and a second bearing support portion on the side of said central portion remote from said cylindrical portion; a motor field core mounted within said cylindrical portion and enclosed thereby; an armature assembly including the shaft supporting a main fan within said shroud; a first bearing in said first bearing support portion journaling said shaft adjacent said main fan; a second bearing in said second bearing support portion journaling said shaft adjacent the end thereof; an armature on said shaft within said field; a commutator on said shaft within said brush holders; and a sleeve of insulating material electrically insulating said shaft from said armature and commutator; said metal housing assembly supporting said motor housing to a location substantially adjacent to said commutator; said metal housing assembly and said motor housing providing sufficient strength to withstand impact loads occurring when objects are pulled into and engage said main fan.

3,875,437

VARIABLE RELUCTANCE TYPE STEP MOTOR

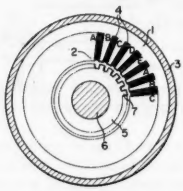
Hiroshi Hara, Ibaraki-ken, and Kazuo Onishi, Hitachi, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 26, 1973, Ser. No. 428,007

Claims priority, application Japan, Dec. 27, 1972, 47-129959

Int. Cl. H02k 37/00

U.S. Cl. 310—49 **7 Claims**



1. A step motor of variable reluctance type comprising a stator core, a plurality of magnetic poles wound with a plurality of excitation windings, a rotor core mounted on a rotary shaft, a plurality of rotor teeth equidistantly formed along the outer periphery of said rotor core and a plurality of stator teeth formed along the inner periphery of said magnetic poles; wherein the phase arrangement of the magnetic poles of the stator core satisfies the equation

$$P(mn \pm [2]k) = Nr$$

where m is the number of phases of the excitation windings, P the number of poles for each phse, Nr the number of rotor teeth, n a given integral number, and k is an integral number greater than one, and further the order of phase arrangement of the magnetic poles of the stator core is determined by the value and sign of k.

3,875,438

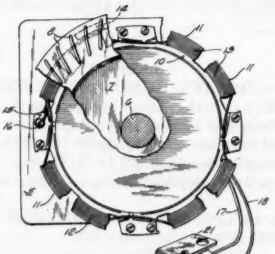
SMALL ENGINE AUXILIARY ELECTRICAL SYSTEM

Paul A. Tharman, Milwaukee, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed Nov. 8, 1973, Ser. No. 414,113

Int. Cl. H01l 3/00

U.S. Cl. 310—68 **8 Claims**



1. An electric power source for a machine driven by an engine having a body, a power output shaft journaled in the engine body, and an alternator rotor having permanent mag-

net means thereon rotatable with said shaft, said power source comprising:

A. an alternator stator having a core with two windings thereon;

B. means for securing said stator to the engine body in cooperative relation to the rotor of the alternator;

C. a grounding terminal connected to one end of each of said stator windings, said grounding terminal being physically and electrically connectable to said core of the stator by the same means which secures the stator to the engine body;

D. a lead extending from the opposite end of each of said two windings; said two leads being the only wires coming from the stator;

E. a socket of insulating material on the end of one of said leads with a terminal therein that is connected to the end of said lead;

F. a second socket of insulating material on the end of the other of said leads;

G. a solid state rectifier in said second socket having one of its terminals connected with the end of said other lead and its other terminal having a contactor thereon; and

H. means for mounting said two sockets on a part rigid with the engine body with the mouths of said sockets at readily accessible locations,

so that a direct current circuit for charging a battery with which the machine is equipped and an alternating current circuit with which the machine is equipped are each readily connectable with one of the stator windings by the insertion of terminals of said circuits into the mouths of said sockets.

3,875,439

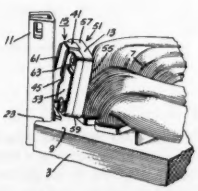
MOUNTING CLIP FOR A DYNAMOELECTRIC MACHINE

Mary E. Roach, De Kalb, Ill., assignor to General Electric Company, Fort Wayne, Ind.

Filed Sept. 17, 1973, Ser. No. 398,144

Int. Cl. H02k *11/00*

U.S. Cl. 310—68 C **19 Claims**



1. In a dynamoelectric machine having a stator with a peripheral surface and at least one end face intersecting therewith, a plurality of windings in the stator having a generally annular grouping of end turns extending from the one end face, the end turns having a portion spaced generally radially inwardly of the peripheral surface of the stator, means for sensing the ambient temperature adjacent the end turns and operable generally to protect the windings in the event of an overload condition thereof; the combination therewith comprising means secured in displacement preventing engagement with at least a part of the stator generally adjacent the one end face thereof for mounting the sensing means between the peripheral surface of the stator and the portion of the end turns radially inwardly thereof and between the one end face and the free end of the end turns extending from the one end face.

3,875,440

CASCADE IMAGE INTENSIFIER TUBE WITH INDEPENDENTLY SEALED SECTIONS

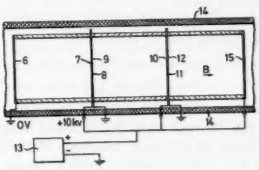
James Dwyer McGee, London, England, assignor to Electron Physics Limited, Surrey, England

Filed Nov. 22, 1972, Ser. No. 308,723

Claims priority, application United Kingdom, Nov. 24, 1971, 054553/71

Int. Cl. H01j *39/18, 39/14*

U.S. Cl. 313—96 **4 Claims**



1. An image intensifier tube comprising an evacuated enclosure; an input window and an output window forming parts of said enclosure, said evacuated enclosure having impervious walls extending between said input and output windows; a first photocathode formed on the input window; a first phosphor screen formed on the output window; and at least one intermediate stage formed by a transparent insulating sheet extending across the interior of the tube and forming a gas-tight seal with the walls of the tube, said sheet extending completely across the interior of the tube and projecting beyond its external walls to provide a barrier electrically isolating parts of the tube on either side of the sheet from substantial potential differentials, a second phosphor screen formed on a first side of said sheet and a second photocathode formed on a second side of said sheet.

3,875,441

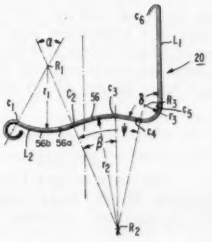
ELECTRON DISCHARGE DEVICE INCLUDING AN ELECTRON EMISSIVE ELECTRODE HAVING AN UNDULATING CROSS-SECTIONAL CONTOUR

Richard Dale Faulkner, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 29, 1973, Ser. No. 420,325

Int. Cl. H01j *43/10, 39/06*

U.S. Cl. 313—104 **5 Claims**



1. An electron discharge device comprising:

a. a series of at least two electron optically aligned electrodes;

b. means for emitting electrons from preceding ones of said series of electrodes comprising an electron emissive surface region on each preceding one of said series of electrodes;

c. means for accelerating electrons emitted from each electron emissive surface region to impinge upon a succeed-

ing one of said electrodes; said emitted electrons being accelerated as a stream of electrons, from a first electrode of said series, to impinge upon succeeding ones of said series in nonrepeating sequence;

d. one of said electrodes comprising an anode for ultimately collecting said electron stream;

e. wherein said electron emissive surface region of the first of said series of electrodes includes a cross-sectional contour substantially characterized by an undulating line of curvature superimposed thereon which includes a plurality of interconnected arcuate regions; and

f. means whereby said first electrode may be excited to a substantially single electrostatic field potential across the entire electron emissive surface portion characterized by said undulating line of curvature.

3,875,442

DISPLAY PANEL

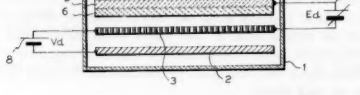
Kiyotaka Wasa, Mara; Fumio Hosomi, and Shigeru Hayakawa, both of Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Osaka, Japan

Filed May 25, 1973, Ser. No. 363,870

Claims priority, application Japan, June 2, 1972, 47-55275; June 24, 1972, 47-63400; June 24, 1972, 47-63401; Dec. 20, 1972, 47-128701

Int. Cl. H01j *17/00;* **H05b** *37/00*

U.S. Cl. 313—193 **5 Claims**



1. A display panel comprising a transparent gas-tight envelope, an ionizable medium in said envelope, two planar main electrodes within said gas-tight envelope lying in different planes and parallel with each other and substantially coextensive with each other, one of said two planar electrodes being a cold cathode and the other of said two planar electrodes being an anode, said anode consisting of a metal screen, said electrodes being for maintaining a cold cathode glow discharge therebetween when a voltage is applied thereacross, and a cathodeluminescent panel positioned on the other side of said anode from said cathode, said cathode-luminescent panel consisting of a transparent glass plate, a transparent electrode means on said transparent glass plate, and a phosphor layer coated on said transparent electrode means, said phosphor layer being on the side of said panel toward said anode.

3,875,443

INCANDESCENT LAMP

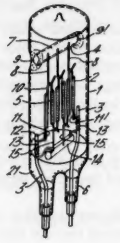
Takeshi Nakamura, Kyoto, Japan, assignor to Matsushita Electronics Corporation, Kadoma, Osaka Prefecture, Japan

Filed Nov. 13, 1973, Ser. No. 415,410

Int. Cl. H01j *1/96, 19/50*

U.S. Cl. 313—274 **4 Claims**

1. An incandescent lamp comprising a glass enclosure, an incandescent filament enclosed in said glass enclosure, a pair of leadin wires extending through said glass enclosure for feeding electrical current to said filament, an upper glass bar having its ends welded to the inner face of said glass enclosure at one end thereof, a lower glass bar being secured in position within said glass enclosure at the other end thereof while having its ends left free from said glass enclosure, and supporting hooks extending between said upper glass bar and said



filament and between said lower glass bar and said filament for supporting said filament in a desired position.

3,875,444

ROTATING X-RAY ANODE HAVING A TARGET AREA MADE OF A TUNGSTEN RHENIUM TANTALUM ALLOY

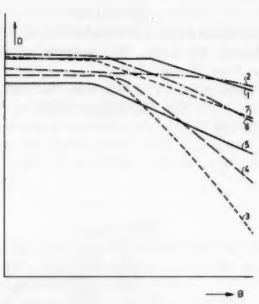
Frederik Magendans, and Bernhard Josef Pieter Van Rheenen, both of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 23, 1973, Ser. No. 418,584

Claims priority, application Netherlands, Dec. 6, 1972, 7216500

Int. Cl. H01j *35/08*

U.S. Cl. 313—330 **2 Claims**



1. A rotating anode for an X-ray tube in which at least the target area for electrons is made of a ternary alloy consisting essentially of about 1 to 5% by weight of rhenium, about 0.1 to 4% by weight of tantalum, and the balance tungsten.

3,875,445

MESHED CATHODE FOR ELECTRON TUBES OF THE GRID-CONTROLLED TYPE

Robert Bachmann, Dottingen, and Hans Notz, Dietikon, both of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Sept. 5, 1973, Ser. No. 394,489

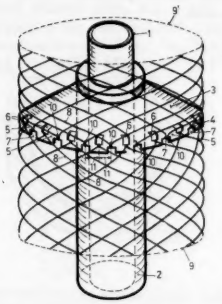
Claims priority, application Switzerland, Sept. 6, 1972, 13031/72

Int. Cl. H01j *1/46, 17/04, 17/12, 19/38*

U.S. Cl. 313—348 **6 Claims**

1. A meshed cathode structure for electron tubes and which is particularly useful for high power grid-controlled transmitting tubes which comprises a supply conduit connectible to a lead-in in the base of the tube, a current-conducting support for the cathode structure secured to said supply conduit, said support being constituted by an annular member which in-

cludes a first circumferential array of uniformly spaced recesses provided in the peripheral edge of said annular support member and a second circumferential array of uniformly spaced apertures provided in the peripheral portion of said annular support member and circumferentially offset from said circumferential array of recesses so as to lie intermediate



the latter, a first cylindrical meshed cathode component, the meshes at one end of which are secured at said circumferentially spaced recesses, and a second co-axial cylindrical meshed cathode component adjacent said first cathode component and wherein the meshes at one end thereof are secured at said circumferentially spaced apertures.

3,875,446

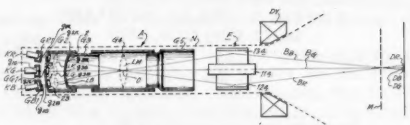
ACUTE ANGLE SOURCE OF PLURAL BEAMS FOR COLOR CATHODE RAY TUBE

Senri Miyaoka, Fujisawa-shi, Kanagawa-ken, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 829,420, June 2, 1969, abandoned. This application July 26, 1973, Ser. No. 382,654

Int. Cl. H01j *29/48, 31/20*

U.S. Cl. 313—414 **8 Claims**



1. a cathode ray tube comprising a screen having arrays of different color phosphors; beams producing means angularly disposed with respect to each other for producing a plurality of electron beams which are in a common plane and originate in spaced relation to each other and at acute angles to each other and which are directed toward said screen in directions at angles to each other so as to impinge on the screen after intersecting each other at a location in the tube between said beam producing means and said screen, said beam producing means including cathode means having electron-emitting surfaces facing generally in said directions of the beams, first grid means confronting said electron-emitting surfaces in adjacent, substantially parallel relation to the latter and having respective spaced apart apertures for the passage of said electron beams therethrough, and a second grid having a wall confronting said first grid means at the side of the latter facing away from said cathode means with portions of said wall being in adjacent, substantially parallel relation to said first grid means and having respective spaced apart apertures which are aligned with respective apertures of said first grid means in said directions of the respective beams for passage of the latter through said apertures of the second grid; first, second and third tubular electrodes arranged successively in axial alignment between said second grid and said screen for the passage of all of said beams therethrough, said first and third electrodes being maintained at a high electrical potential relative to said second electrode for establishing an electrical field constituting a main focusing electron lens common to all of said beams and being positioned to dispose the center of said electrical field subtantially at said location where the beams intersect for diminishing the effects of certain optical abberations; an an end wall on said first tubular electrode at the end of the latter facing toward said wall of the second grid with portions of said end wall being in substantially parallel relation to said portions of the second grid wall and having respective spaced apart apertures which are aligned with said apertures of the second grid wall in said directions of the respective beams for passage of the latter through said apertures in the end wall of said first tubular electrode, said second grid being maintained at an electrical potential substantially less than that of said first tubular electrode for establishing individual electrical fields between the aligned apertures of said second grid wall and said end wall of the first tubular electrode through which the respective beams pass between said beam producing means and said main focusing electron lens and which constitute relatively spatially displaced individual prefocusing electron lenses for the respective beams each operative to partially focus the respective beam and to combine with the effect of said main focusing electron lens for focusing the respective beam on said screen.

3,875,447

HIGH WRITING SPEED DARK-TRACE TUBE WITH FLOOD BEAM ENHANCEMENT

Benjamin Kazan, Mohegan Lake, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 12, 1972, Ser. No. 314,289

Int. Cl. H01j *29/14, 31/08*

U.S. Cl. 313—465 **4 Claims**

1. A dark-trace cathode ray tube comprising an evacuated envelope with a transparent faceplate,

screen means mounted within said envelope and adjacent said faceplate comprising a layer of a photochromic material on a transparent electrically conductive support, and a UV phosphor layer coated on said photochromic material layer on the side opposite said faceplate,

a writing means for scanning selected areas of said photochromic screen means with electrons and thus changing the electric potential of selected areas in said photochromic screen means,

a flooding means for flooding said photochromic screen means, with low energy electrons to maintain a bistable potential pattern and producing darkening of the more positive areas, whereby the electrons from said writing means form a charge pattern on said phosphor layer and the electrons from said flooding means maintain a bistable potential pattern and causes said phosphor layer to fluoresce in accordance with said charge pattern wherein said photochromic material darkens in accordance with the fluorescence,

a collector means positioned adjacent to said photochromic screen means and in the path of electrons from said writing means and said flooding means, the secondary emis-

sion ratio of said photochromic screen means being greater than unity and said collector means serving to collect the secondary emission electrons emitted from said photochromic screen means when selected areas are scanned by said writing means to establish said bistable potential pattern and further serving to collect the secondary emission electrons from said photochromic screen means when said selected areas are bombarded by electrons from said flooding means thereby shifting said selected areas to the potential of said collector means, said photochromic screen means being initially uniformly charged to the same potential as said flooding means, said potential being negative with respect to said collector means but substantially positive with respect to said writing means, and

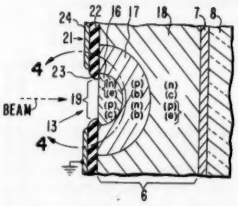
erase means for erasing the dark-trace pattern on said photochromic screens means comprising terminal means connected to said transparent electrically conductive support and adapted to receive an erase pulse to develop a uniform negative charge pattern over said screen means.

3,875,448

CAMERA TUBE HAVING A TARGET FORMED BY AN ARRAY OF PHOTOTRANSISTORS

Ronald L. Bell, Woodside, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed Oct. 23, 1968, Ser. No. 769,895
Int. Cl. H01j *29/45, 31/38*
U.S. Cl. 313—368 **2 Claims**



1. In a camera tube for converting a photon image into a sequence of electrical signals, the combination comprising:

a cathode means for providing an electron beam current;

an array of phototransistor devices conductively responsive to the photon image, one element of each phototransistor device having at least a portion thereof directly exposed to the electron beam current;

means for scanning the electron beam current periodically over the phototransistor array to cause the electron beam current to strike the exposed portions;

a shunt capacitor proximate the exposed portions and formed by an insulative layer of dielectric material positioned over the phototransistor array with a film of conductive material positioned over the insulative layer, both the insulative layer and the conductive film having an array of apertures in registration with the exposed regions to permit passage of the electron beam current therethrough to the exposed portions, the shunt capacitor connected in parallel circuit relationship with respect to the cathode means and initially charged and periodically recharged by the electron beam current while discharged through the phototransistor array by the photon image to establish variations in the electron beam current; and

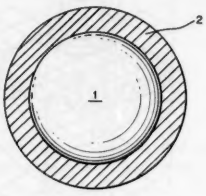
means for developing a sequence of electrical signals in response to the electron beam current variation.

3,875,449

COATED PHOSPHORS

William H. Byler, Landing, and James J. Mattis, Long Valley, both of N.J., assignors to U.S. Radium Corporation, Morristown, N.J.

Continuation-in-part of Ser. No. 863,371, Oct. 2, 1969,. This application Nov. 2, 1971, Ser. No. 194,902
Int. Cl. H01j *29/20, 29/26, 29/18*
U.S. Cl. 313—466 **25 Claims**



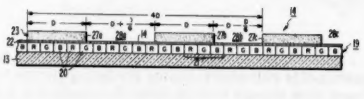
1. A phosphor composite in particulate form, each particle comprising a phosphor core of substantially uniform composition throughout, substantially completely surrounded by a coating which modifies the luminescent quality of the composite, said coating comprising a filter coating (a) being of a thickness such as to permit the transmission therethrough of at least a portion of the light emitted by the phosphor core particle, (b) being of substantially uniform composition throughout its thickness, and (c) being coalesced into a substantially continuous film enveloping the underlying phosphor core particle and leaving substantially no portion thereof uncovered, there being no barrier layer between said phosphor core and said coating.

3,875,450

CATHODE-RAY TUBE WITH RADIATION-EMITTING INDEX STRIP-LIKE AREAS

Roger Dunwoody Thompson, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 26, 1973, Ser. No. 335,537
Int. Cl. H01j *31/20, 29/34*
U.S. Cl. 313—471 **9 Claims**



1. A cathode-ray tube including a target structure and means for projecting an electron beam toward said target structure; said target structure comprising a viewing screen including a periodic series of color groups of parallel light-emitting color phosphor strips and an indexing means comprising a plurality of indexing strip-like areas of radiation-emissive indexing material and spaces therebetween,

the color phosphor strips of each color group being adapted to emit different colors of light when scanned by said beam, and said strip-like areas having a response to the impingement of an electron beam different from said spaces, said strip-like areas, said spaces and said color phosphor strips being mutually parallel,

one of said strip-like areas and said spaces being of substantially equal widths and the other of said strip-like areas and said spaces being alternately of two different widths, the average of said two different widths being substantially equal to said equal width, and the width of two consecutive strip-like areas and two spaces being equal to the width of six consecutive color groups.

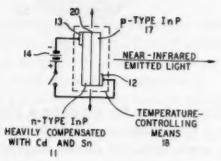
3,875,451
NEAR-INFRARED LIGHT-EMITTING AND LIGHT-DETECTING INDIUM PHOSPHIDE HOMODIODES INCLUDING CADMIUM TIN PHOSPHIDE THEREIN

Klaus Jurgen Bachmann, Piscataway; Ernest Buehler, Chatham; Joseph Leo Shay, Marlboro, and Jack Harry Wernick, Madison, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hills, N.J.

Continuation-in-part of Ser. No. 382,021, July 23, 1973, , which is a continuation-in-part of Ser. No. 315,359, Dec. 15, 1972, abandoned. This application Dec. 10, 1973, Ser. No. 423,453

Int. Cl. H01j *1/62, 63/04*

U.S. Cl. 313—498 **3 Claims**



1. A light-emitting diode of the type comprising a crystalline body of indium phosphide (InP) including both p-type and n-type portions forming a junction and electrode means for electrically coupling to said body, said n-type portion being characterized by quantities of cadmium and tin substantially exceeding impurity doping levels, the tin being present in a quantity exceeding that of the cadmium but most of said cadmium together with an equal quantity of said tin forming a significant minor portion of cadmium tin phosphide ($CdSnP_2$) in said InP.

3,875,452
CATHODE RAY TUBE WITH LONGITUDINALLY SEAMED BODY PORTIONS

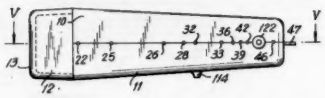
Anthony Victor de Vere Krause, 3 Beechcroft, Ashtead, England

Continuation of Ser. No. 123,279, March 11, 1971, abandoned. This application July 9, 1973, Ser. No. 377,778

Claims priority, application United Kingdom, Mar. 12, 1970, 11794/70; Mar. 12, 1970, 11793/70; Feb. 23, 1971, 5214/71

Int. Cl. H01j *29/00, 31/00*

U.S. Cl. 313—482 **6 Claims**



1. A cathode ray tube comprising a glass envelope and a plurality of electrodes therein forming an electron gun assembly; said envelope including two body portions joined together along a seam, conductors supporting and positioning the electrodes of said gun assembly within said envelope, said conductors forming electrical connections to the electrodes from exteriorly of the envelope, said conductors passing through the seam, said envelope including a screen cup having a phosphor-coated face of the tube formed therein, and a second seam joining said screen cup to said body portions; said tube including a directly heated cathode filament and a grid electrode including a metal plate with a grid aperture therein, at least one grid conductor wire supporting said grid plate in the envelope and passing through the seam between the body portions, and two filament conductor wires supporting said filament in the envelope and passing through the seam between the body portions.

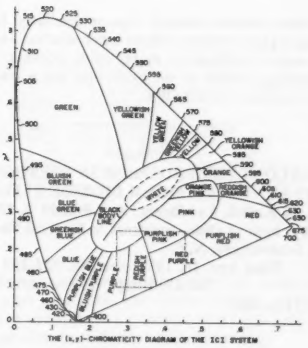
3,875,453
LAMP WITH HIGH COLOR-DISCRIMINATION CAPABILITY

William A. Thornton, Jr., Cranford, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 10, 1973, Ser. No. 387,391

Int. Cl. H01j *63/04*

U.S. Cl. 313—487 **7 Claims**



7. The method of efficiently generating light which provides substantially improved color discrimination for illuminated objects, which method comprises:

a. blending together (1) a first light constituent having emission principally confined to the 400–470 nm wavelength range, (2) a second light constituent having an emission principally confined to the 500–550 nm wavelength range, and (3) a third light constituent having an emission principally confined to the 610–680 nm wavelength range; and

b. controlling the relative light intensities of said first, second and third light constituents to produce visible light of predetermined x and y values of ICI coordinates, said x value being in the range of 0.27 to 0.45, and said y value being in the range of 0.09 to 0.25.

3,875,454

LOW-PRESSURE MERCURY VAPOUR DISCHARGE LAMP AND METHOD OF MANUFACTURING SAID LAMP

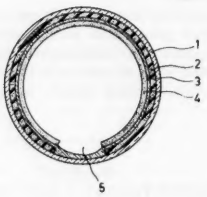
Rein Willemse Van Der Wolf, and Thomas Hendrik De Vette, both of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 5, 1973, Ser. No. 412,606

Claims priority, application Netherlands, Nov. 25, 1972, 7216025

Int. Cl. H01j *1/70, 61/35*

U.S. Cl. 313—488 **2 Claims**



1. A low-pressure mercury vapour discharge lamp which comprises a glass envelope whose inner side has a luminescent coating and a transparent metal oxide coating, said metal oxide coating consists of tin oxide and has a resistance per square of at least 10,000 Ohm.

3,875,455

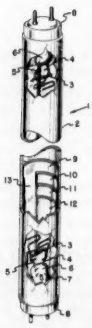
UNDERCOAT FOR PHOSPHOR IN REPROGRAPHIC LAMPS HAVING TITANIUM DIOXIDE REFLECTORS

Edward E. Kaduk, Lyndhurst, and Ronald J. Olwert, Willoughby, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 18, 1973, Ser. No. 352,252

Int. Cl. H01j *61/35*

U.S. Cl. 313—489 **6 Claims**



1. An aperture-type fluorescent reprographic lamp comprising an elongated envelope containing an ionizable medium including mercury vapor and having electrodes at the respective ends thereof, a TiO_2 reflector coating within said envelope and a phosphor coating within said reflector coating, wherein the improvement comprises an undercoat of MgO combined with Al_2O_3 between and in contact with said phosphor coating and said reflector coating.

3,875,456

MULTI-COLOR SEMICONDUCTOR LAMP

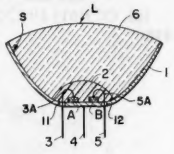
Tsuyoshi Kano; Tadashi Saitoh; Atsushi Suzuki; Teruki Suzuki; Shigekazu Minagawa, and Yoshiro Otomo, all of Tokyo, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 4, 1973, Ser. No. 347,660

Claims priority, application Japan, Apr. 4, 1972, 47-33725

Int. Cl. H03k *3/42*

U.S. Cl. 313—501 **18 Claims**



1. A semiconductor lamp for emitting a plurality of colors of light as if from a single source of light comprising a plurality of light-emitting semiconductor diodes disposed closely adjacent one another in distinct and separate positions on a common support means and capable of emitting light of respectively different colors, a common light scattering layer covering said light-emitting diodes acting to disperse the light from said diodes to provide the appearance of a single source of light emitting said respectively different colors from the same position therein, and input terminal means for each of said diodes extending therefrom for receiving electrical input signals to selectively energize said diodes to transmit light of various colors through said light scattering layer.

3,875,457

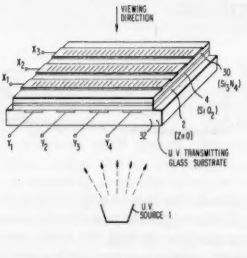
FIELD RESPONSIVE PHOTOLUMINESCENT DISPLAY DEVICES

Benjamin Kazan, and Thomas O. Sedgwick, both of Westchester, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 26, 1972, Ser. No. 318,136

Int. Cl. H01j *31/48*

U.S. Cl. 315—11 **8 Claims**



1. An image storage and display device comprising:

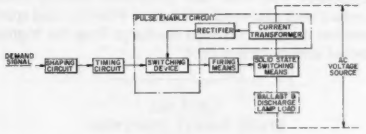
a solid layer of phosphor material having formed on one surface thereof a layer of electrically insulating material and on its opposite surface a layer of conductive material; means for exposing said phosphor material to light to stimulate it to a level of luminescence dependent upon the electric field across said phosphor layer. and

means for applying a charge pattern to said insulating layer resulting in an electric field pattern across said phosphor layer corresponding to said charge pattern.

3,875,458
DIMMER FOR DISCHARGE LAMP UTILIZING A PULSE ENABLING CIRCUIT

George A. Kappenhagen, Mechanicsburg, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 10, 1974, Ser. No. 478,137
Int. Cl. H05b *41/16*; G05f *1/08*
U.S. Cl. 315—194 3 Claims



1. A lighting control apparatus responsive to an electrical demand signal to control the portion of each half cycle during which voltage is supplied to a discharge lamp load from an AC voltage source, said apparatus comprising:

a. solid state switching means having gating means and two power terminals, said power terminals being adapted to be connected in series with said load across said AC voltage source;

b. a single pulse per half cycle firing means having an output connected to said gating means of said solid state switching means, which firing means renders said solid state switching means conductive when said firing means is initiated;

c. a pulse enable circuit means having an output connected to said firing means, for sensing the status of said solid state switching means and preventing the activation of said firing means when said solid state switching means is in a conductive state;

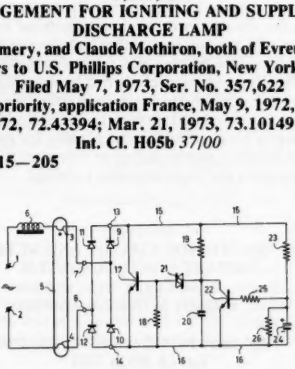
d. a timing circuit having an output connected to said pulse enable circuit means, said timing circuit generating a signal, which, when coupled through to the firing means by said pulse enable circuit means, will initiate the firing means to render the solid state switching means conductive; and

e. a shaping circuit having an output electrically connected to said timing circuit, said shaping circuit being adapted to receive said demand signal and to generate an output signal which is a function of said demand signal.

3,875,459
ARRANGEMENT FOR IGNITING AND SUPPLYING A DISCHARGE LAMP

Michel Remery, and Claude Mothiron, both of Evreux, France, assignors to U.S. Phillips Corporation, New York, N.Y.

Filed May 7, 1973, Ser. No. 357,622
Claims priority, application France, May 9, 1972, 72.16521; Dec. 6, 1972, 72.43394; Mar. 21, 1973, 73.10149
Int. Cl. H05b *37/00*
U.S. Cl. 315—205 26 Claims

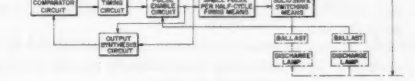


1. An ignition circuit for a discharge lamp having preheatable electrodes comprising, a pair of input terminals adapted to be connected to a low frequency alternating voltage supply source, means connecting a stabilizing inductor in series with the lamp across said input terminals, a starter circuit for the lamp electrodes including means connecting the ends of the lamp electrodes remote from the input terminals together via a transistor switch, a control circuit coupled to the input terminals and connected to the base of the transistor and including means for closing the transistor switch during a first part of the ignition procedure of the lamp and which opens said transistor switch in the operation condition of the lamp, said control circuit including a branch circuit which is energized at least during the last part of the ignition procedure of the lamp, said branch circuit having timing circuit means with a short time constant relative to the period of the alternating supply voltage so that the transistor is rendered conducting and non-conducting at least several times during a half cycle of the alternating voltage.

3,875,460
SYNTHESIS OF DIMMER OUTPUT WAVEFORM WITHIN THE DIMMER LOGIC CIRCUIT

George A. Kappenhagen, Mechanicsburg, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 10, 1974, Ser. No. 478,138
Int. Cl. H05b *41/16*; G05f *1/08*
U.S. Cl. 315—291 5 Claims



1. A lighting control apparatus responsive to an electrical demand signal to control the portion of the voltage cycle during which the voltage is supplied to a lamp load from an A.C. voltage source; said apparatus comprising:

a. solid-state switching means adapted to be connected in series with said load across said A.C. voltage source;

b. a firing means having an output connected to said solid-state switching means, which firing means renders said solid-state switching means conductive when said firing means is initiated;

c. a timing circuit connected to said firing means for initiating said firing means;

d. a comparator circuit having first and second inputs and having an output connected to said timing circuit, the signal at said comparator output being effective to adjust said timing circuit in response to the difference between the signals on said inputs of said comparator circuit;

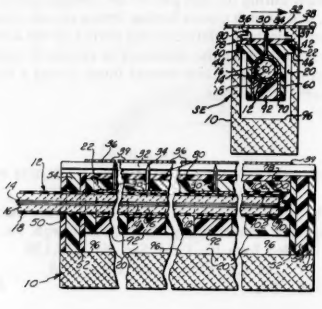
e. a shaping circuit having an output connected to said first input of said comparator circuit, said shaping circuit being adapted to receiving said demand signal and to generating an output signal which is a function of said demand signals; and

f. an output synthesis circuit having an output connected to said second input of said comparator circuit, said output synthesis circuit having a first input connected to the output of said timing circuit and a second input connected to the A.C. voltage source, said output synthesis circuit including means for generating an output signal which is essentially zero during that portion of the voltage cycle which said timing circuit has not initiated said firing means and which is a function of said A.C. voltage source during that portion of the voltage cycle which said timing circuit has initiated said firing means.

3,875,461
STATIC ELIMINATOR

Robert Harold Richardson, Melbourne; William Merdoc Smith, Palm Bay, and Robert Carlton Davis, Eau Gallie, all of Fla., assignors to Harris-Intertype Corporation, Cleveland, Ohio

Filed Sept. 18, 1973, Ser. No. 398,377
Int. Cl. H01t *19/04*
U.S. Cl. 317—2 F **14 Claims**



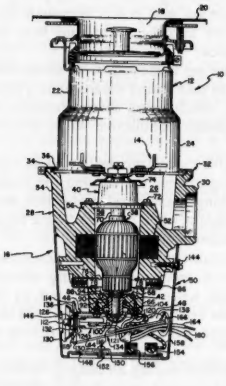
1. A static eliminator comprising:
an elongated hollow metal housing having inwardly facing walls, and a longitudinally extending opening therein to define a longitiudinally extending channel in said housing, an elongated nonconductive strip member mounted in said housing within said channel and extending longitudinally therein,
a cable having an inner conductive core surrounded by a dielectric layer extending longitudinally of said housing and mounted to said strip member,
said strip member having a longitudinally extending groove for receiving said cable therein,
a plurality of longitudinally spaced apart conductive layers secured to said groove prior to assembly of said cable in said groove in said strip member,
a plurality of needlelike electrically conductive projections each having one end in an electrical engagement with a said conductive layer and extending therefrom through said strip member with said plurality of projections being oriented at longitudinally spaced locations corresponding with said plurality of conductive layers, each said projection having a portion of its length at its opposite end being configured to form a pointed end extending beyond said strip member in the direction toward the opening in said housing
said strip member has a mounting portion and a body portion, said mounting portion being secured to said housing and said body portion having outwardly facing walls spaced inwardly from the inwardly facing walls of said housing to define an air pocket therebetween so as to thereby minimize the dielectric constant between said core and said metal housing.

10. A static eliminator comprising:
an elongated cable having an inner conductive core surrounded by a dielectric layer, said core adapted to be connected to a high voltage source,
an array of longitudinally spaced electrically conductive needles each having a sharp projection at one end facing in a direction away from said cable,
a like plurality of conductive layers longitudinally aligned and electrically spaced from each other, each said layer being in electrical contact with an associated one of said needles at a point interposed between the projecting end of the associated needle and said elongated cable, each said conductive layer being electrically spaced from said conductive core by said dielectric layer so as to define electrical capacitance between said needle and said core, said cable having a terminated end,
an electrically conductive spherical member,
an electrically conductive projection extending from said spherical member,
said spherical member being mounted so as to abut the terminated end of said cable with said projection extending into said cable for a portion of its length adjacent said terminated end with said projection making electrical contact with said conductive core whereby said spherical member minimizes corona discharge from the terminated end of said electrical core.

3,875,462
FOOD WASTE DISPOSER

George E. Kiefer, and Lauren W. Guth, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Feb. 1, 1973, Ser. No. 328,683
Int. Cl. H02h *7/08, 7/085*
U.S. Cl. 317—13 R **7 Claims**



1. An electrically energized food waste disposer comprising an electrically non-conductive stator housing; a vertical rotor bearing carried by the housing and exposed on the lower housing end; a thermally and electrically conductive member affixed to the housing in thermal and electrical contact with the bearing, said conductive member including an imperforate section enclosing the bearing end; a lubricate source adjacent the lower bearing end; a switch carried by the member in heat exchanging relation thereto for de-energizing the disposer in response to a detrimental change in operating condition of said bearing; a cover affixed to the housing for enclosing the switch and member and including an electrical terminal; and means grounding the member to the terminal.

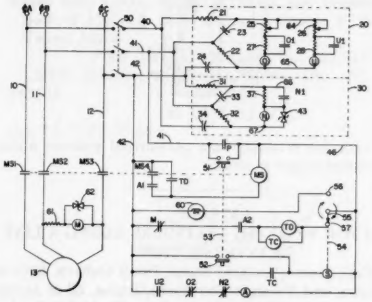
3,875,463
MOTOR PROTECTION CIRCUIT AND AUTOMATIC RESTART CONTROL SYSTEM

William L. Reuter, Rapid City, S. Dak., and Allen P. Schmidt, Edina, Minn., assignors to Dunham Associates, Inc., Rapid City, S. Dak.

Filed Mar. 14, 1974, Ser. No. 450,998
Int. Cl. H02h *7/09*
U.S. Cl. 317—13 R **13 Claims**

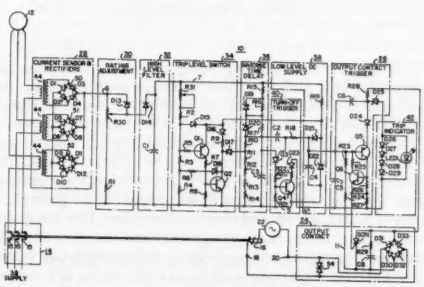
1. A monitoring system for controlling the state of connection of an electrical load to a three-phase electrical power source, comprising:
a. sequence analyzer means for measuring a symmetrical component of input voltages applied thereto;

b. input means for connecting said sequence analyzer means to the power source;
c. line switching means for controlling the connection of the load to the three-phase power source;
d. control means connected to said line switching means and said sequence analyzer means, said control means for causing disconnection of the load from the power source when the magnitude of the symmetrical component varies from a predetermined acceptable range of values and for



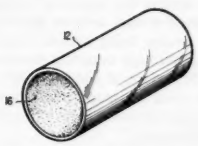
causing reconnection of the load when the symmetrical component magnitude returns within the acceptable range;
e. residual voltage sensing means connected to the load for sensing residual voltages thereat; and
f. means connecting said residual voltage sensing means to said control means for inhibiting said control means from reconnecting the load to the power source if the residual voltage exceeds a predetermined value.

3,875,464
SOLID STATE OVERLOAD RELAY
Wardell Gary, and Emroy W. Lange, both of Beaver, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Oct. 10, 1973, Ser. No. 405,198
Int. Cl. H02h *7/085*
U.S. Cl. 317—13 R **17 Claims**



1. An electronic overload relay connectable in series with the operating coil of a contactor for protecting a motor from overheating due to carrying greater than selected current comprising:
an output contact connected in series with the contactor coil being switchable between a high resistance level where current flows through the coil as limited and the contactor is unenergized and a low resistance level where there is sufficient current flow through the coil to energize the contactor;
output contact trigger means connected to said output contact for switching said output contact to the high resistance level or the low resistance level;
current sensing means connected to sense motor current and to supply an output signal proportional to motor current;
time delay means connected between said output contact trigger means and said current sensing means and being responsive to the level of the output signal from said current sensing means to energize said output contact trigger means after a time delay only when a current greater than a selected current flows to the motor;
said output contact trigger means being constructed to switch said output contact to the high resistance level when energized from said time delay means;
said output contact trigger means comprises a first energy storage means for storing energy when said output contact trigger means is energized from said time delay means and being connected to keep said output contact trigger means energized for a predetermined time after the energizing signal from said time delay is removed without requiring any external power thus maintaining said output contact at the high resistance level and preventing the contactor from being energized for the predetermined time.

3,875,465
LOST GAS INDICATOR FOR GAS TUBE LIGHTING ARRESTORS
Charles E. Riedel, Villa Park, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.
Filed Oct. 18, 1973, Ser. No. 407,685
Int. Cl. H02h *3/22*
U.S. Cl. 317—61 **8 Claims**

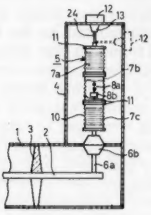


1. A gas tube lightning arrestor comprising:
a tubular envelope;
a pair of electrodes respectively sealed upon the end portions of said tubular envelope;
an inert, pressurized gas disposed within said envelope; and
means within said envelope for automatically indicating leakage of said gas from said envelope comprising a dessicant electrolyte coated upon the interior surface of said envelope and which during normal operation of said arrestor remains inert but upon the occurrence of leakage of said gas from said envelope and admission of air within said envelope, atmospheric moisture is able to react with said electrolyte rendering the same electrically conductive.

3,875,466
VOLTAGE OVERLOAD ARRESTER FOR HIGH-VOLTAGE SWITCHING SYSTEM

Werner Jakszt, Heilmannring, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 20, 1973, Ser. No. 399,354
Claims priority, application Germany, Sept. 27, 1972, 2247996
Int. Cl. H02h 9/06
U.S. Cl. 317—62 4 Claims



1. In a high-voltage switching system, of the type including a switching housing containing a gaseous insulating medium, a voltage overload arrester housing also containing a gaseous insulating medium, a voltage overload arrester disposed in the arrester housing, and a monitoring device, coupled between a ground terminal of the overload arrester and ground potential, for monitoring the response of the arrester and providing a measure of the magnitude of the discharge currents flowing therethrough, the improvement comprising an electrically conductive feedthrough coupling member, coupled to said ground terminal of said arrester and to said monitoring device, and extending outwardly through said arrester housing, said feedthrough coupling member comprising an electrical conductor coupled to said ground terminal of said overload arrester, a body member constructed of electrical insulation material and including an elongated, axially disposed aperture in which said electrical conductor is disposed, and gas-tight sealing means for preventing the escape of said gaseous insulating medium contained in said arrester housing therefrom, and said monitoring device being coupled between ground potential and said feedthrough coupling member and being disposed on the outside surface of said overload arrester housing, said feedthrough coupling member and said monitoring device forming an integral structural unit extending outwardly through said arrester housing.

3,875,467
GEOMETRICAL AND SYMMETRICAL GAS TUBE LIGHTNING PROTECTORS

Charles E. Riedel, Villa Park, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Oct. 23, 1973, Ser. No. 408,699
Int. Cl. H02h 1/00, 3/22
U.S. Cl. 317—62 8 Claims

1. A geometrical and symmetrical gas tube lightning protector comprising:

a supporting member;

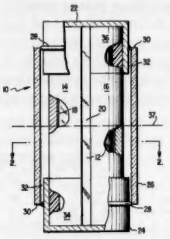
a pair of electrodes, each of which in turn includes a pair of arcing surfaces, supported upon said supporting member in such a manner whereby said electrodes and said arcing surfaces face each other so as to define a pair of arcing areas therebetween;

a pair of end caps secured to the end portions of said supporting member and said electrodes;

insulation means associated with said electrodes for respectively insulating selected portions of each of said electrodes from one of said end caps;

an inert, pressurized gas disposed within said protector; and

sleeve means disposed about said electrodes and sealed to

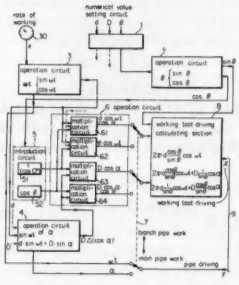


said ends for retaining said pressurized gaseous atmosphere within said protector.

3,875,468
SYSTEM FOR WORKING CYLINDERS ALONG A LINE OF INTERSECTION

Takashi Yagi, Iruma; Sadaaki Nanai; Souji Ouhara, both of Kitakyushu, and Yukihiro Shirakawa, Iruma, all of Japan, assignors to Kabushiki Kaisha Yaskawa Denki Seisakusho, Fukuoka-ken, Japan

Filed Sept. 13, 1973, Ser. No. 396,770
Claims priority, application Japan, Sept. 13, 1972, 47-92599
Int. Cl. G05b 19/32
U.S. Cl. 318—575 10 Claims



1. In a system for working along a line of intersection between first and second cylinders whose axes intersect, the combination of means adjustable to produce electrical signals (d), (D), and (θ) which represent, respectively, the diameters of the first and second cylinders and the angle of intersection of their axes, means responsive to the rotation of the first cylinder about its axis to produce a corresponding electrical signal (ωt), an electrical oscillator operative to generate a series of accurately spaced electrical impulses, first integrator means connected to receive said electrical impulses and said electrical signal (ωt) and to produce delta modulation pulses representative of the values ($\Delta \sin \omega t$) and ($\Delta \cos \omega t$), second integrator means connected to receive the electrical signal (d) and the delta modulation pulses ($\Delta \sin \omega t$) and to produce delta modulation pulses ($d.\Delta \sin \omega t$) in response thereto, third integrator means connected to receive the electrical signal (D) and feedback signals, and to produce delta modulation pulses ($D.\Delta \sin \alpha$), first comparator means connected to receive the delta modulation pulses ($d.\Delta \sin \omega t$) on the one hand and the delta modulation pulses ($D.\Delta \sin \alpha$) on the other hand, the output of said first comparator being connected to supply said feedback signals to said third integrator means for operating same in a servo mode to produce a delta modulation signal

(D.Δ sin α) where (α) is the angle of rotation obtained when the angle of rotation (ωt) of the first cylinder is shifted onto the second cylinder, second comparator means connected to receive the delta modulated signals and to produce working tool driving signals in response thereto and means for driving a working tool in response to said working tool driving signals.

3,875,469

ANODE STRUCTURE FOR MAGNETRON

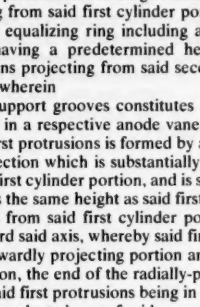
Kazuo Sato, Tokyo; Shigeki Hirohata, and Tomokatsu Oguro, both of Mobara, all of Japan, assignors to Hitachi Ltd., Tokyo, Japan

Filed Dec. 11, 1973, Ser. No. 423,818

Claims priority, application Japan, Dec. 20, 1972, 47-145538

Int. Cl. H01j *23/22*

U.S. Cl. 315—39.69 **10 Claims**



1. An anode structure for a magnetron comprising an anode cylinder;

plural anode vanes radially inwardly projecting from the inner periphery of said anode cylinder; and

a first equalizing ring and a second equalizing ring, each of said equalizing rings being fitted in a plurality of support grooves formed in said anode vanes,

said first equalizing ring including a first cylinder portion having a predetermined height and first protrusions projecting from said first cylinder portion,

said second equalizing ring including a second cylinder portion having a predetermined height and second protrustions projecting from said second cylinder portion; and wherein

each of said support grooves constitutes a rectangular recess formed in a respective anode vane, and

each of said first protrusions is formed by an offset parallelepiped projection which is substantially parallel with the axis of said first cylinder portion, and is substantially flush with and has the same height as said first cylinder portion and extends from said first cylinder portion radially inwardly toward said axis, whereby said first protrusion has a radially inwardly projecting portion and an axially projecting portion, the end of the radially-projecting portion of each of said first protrusions being in contact with that side wall of a selected one of said support grooves which is nearer to the axis of said anode cylinder, the end of the axially-projecting portion thereof being in contact with the bottom of said selected one of said support grooves, to thereby fix said first equalizing ring in position.

3,875,470

COMBINED MAGNETRON AND RESONANT STABILIZING FILTER

Alan Hugh Pickering, Chelmsford, England, assignor to English Electric Valve Company, Limited, Essex, England

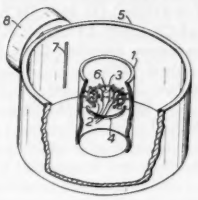
Filed Dec. 13, 1973, Ser. No. 424,632

Claims priority, application Great Britain, Dec. 21, 1972, 59134/72

Int. Cl. H01j *25/50*

U.S. Cl. 315—39.77 **7 Claims**

1. A combined magnetron and resonant stabilizing filter structure comprising a magnetron having a cathode, an anode surrounding said cathode said anode constituted by a cylindrical wall, a plurality of members extending towards the cathode from said cylindrical wall to provide a plurality of magnetron cavities each between two adjacent members, and phase locking means electrically to lock together in-phase magnetron cavities for operation exclusively in the π-mode; the resonant stabilizing filter structure comprising an outer resonant cavity coaxially surrounding said nagnetron; and a plurality of cou-



pling apertures defined by said cylindrical wall, said apertures coupling said in-phase magnetron cavities to said outer cavity and being dimensioned to provide a relatively small coupling factor whereby the oscillating frequency of the magnetron is substantially independent of the resonant frequency of the outer resonant cavity.

3,875,471

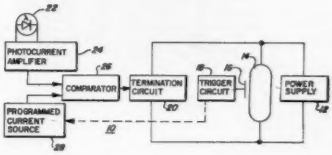
PHOTOFLASH SOURCE CONTROL CIRCUIT

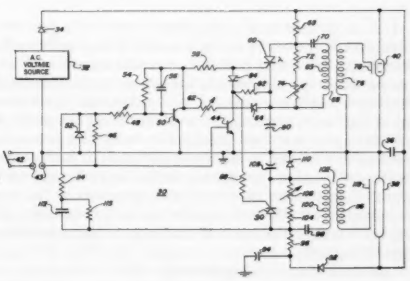
Robert J. Buck, Dover, N.J., assignor to Berkey Photo, Inc., Paramus, N.J.

Filed Jan. 18, 1974, Ser. No. 434,839

Int. Cl. H05b *41/36*

U.S. Cl. 315—151 **7 Claims**





1. Apparatus for controlling the operation of a light emitting flash source and comprising:

flash source initiating means for initiating the operation of said flash source;

light sensitive means for generating a first electrical signal responsive to the light generated by said flash source;

programmed signal generating means for generating a second electrical signal having a magnitude varying as a function of time and independent of the light generated by said flash source; and

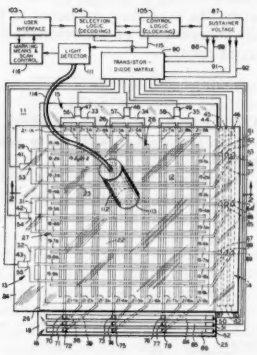
flash source terminating means for terminating the operation of said flash source in response to said first and second electrical signals.

3,875,472

METHOD OF AND SYSTEM FOR LIGHT PEN READ-OUT AND TABLET WRITING OF MULTICELLED GASEOUS DISCHARGE DISPLAY/MEMORY DEVICE

Jerry D. Schermerhorn, Swanton, Ohio, assignor to Owens, Illinois, Inc., Toledo, Ohio

Filed June 29, 1973, Ser. No. 375,083
Int. Cl. G11c *7/00*
U.S. Cl. 315—169 TV **23 Claims**



1. A method of ascertaining the location of a gaseous discharge display/memory cell in a matrix of such cells, each cell comprising proximate portions of conductors in each of two conductor arrays, an ionizable gas volume in the vicinity of the proximate conductor portions, and a dielectric layer separating at least one conductor portion from said gas volume, each cell having at least two electrically independent conductor portions in one array in sufficient proximity to each other and to the cell's conductor portion in the second array to form plural discharge sub sites between conductors of the respective arrays such that an on state of discharge in any sub site of the cell causes an on state of discharge in the remaining sub sites of the cell,

said method comprising the steps of:

applying a sustaining potential waveform across the two conductor arrays;

sequentially creating light emiting discharges in selected sub sites of the matrix during dormant time periods of cell response to the sustaining potentials while maintaining the internal information content of the cells;

detecting light emitted over a restricted area of the matrix during the dormant time periods of cell response to the sustaining potentials;

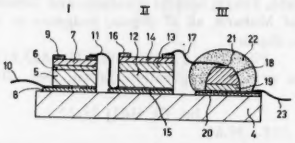
and restricting the light emitting discharge in selected cells of the matrix during dormant time periods of cell response to less than all sub sites of each selected cell.

3,875,473

POLYCHROMATIC ELECTROLUMINESCENT DEVICE

Jacques Lebailly, Caen, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 11, 1973, Ser. No. 423,701
Claims priority, application France, Dec. 13, 1972, 72.44359
Int. Cl. H05b *41/00*; H01j *63/04*; H01l *15/00*
U.S. Cl. 315—169 TV **19 Claims**



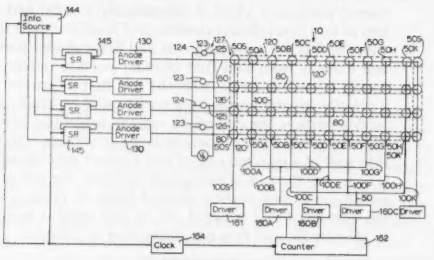
1. An electroluminescent device formed by several interconnected elementary light sources which are energized simultaneously and at least two of which emit electroluminescent radiations of different wavelengths, characterized in that the light flux emitted by a first source which emits a radiation of a first colour is larger than that of a second source of the device when the same current of intensity I_1 is injected into each of the said sources and the light flux which is emitted by the second source which emits a radiation of a different colour is larger than that of the first source of the device when the same current of intensity I_2 which differs from I_1 is injected into each of the said sources, and that the light sources of the device are connected in series.

3,875,474

PANEL-TYPE DISPLAY DEVICE

James A. Ogle, Neshanic Station, and George E. Holz, North Plainfield, both of N.J., assignors to Burroughs Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 252,308, May 11, 1972, abandoned, which is a division of Ser. No. 850,984, Aug. 18, 1969, abandoned, which is a continuation-in-part of Ser. No. 828,793, May 28, 1969, abandoned. This application Dec. 26, 1973, Ser. No. 428,292
Int. Cl. H05b *37/00*
U.S. Cl. 315—169 TV **28 Claims**



1. A display system including

a display panel having an array of gas-filled display cells formed in an insulating sheet and disposed in rows and columns, said insulating sheet having a top surface and a bottom surface and said cells having upper ends and lower ends, lying in said top surface and said bottom surface of said sheet, respectively,

a cathode electrode aligned with each column of cells and disposed on said top surface of said sheet adjacent to said upper ends of said cells, and an anode electrode aligned with each row of cells and disposed on said lower surface of said sheet adjacent to said lower ends of said cells,

said cathode and anode electrodes being used for applying firing potential across selected cells to ionize the gas in a

cell and thereby cause a cell to glow, the ionization and firing of a cell causing the generation of excited particles and charged particles including electrons, ions, metastable states and the like,

each cell having a characteristic firing potential, said characteristic firing potential having a characteristic value for ionizing and firing a cell initially without the aid of external stimuli such as excited particles,

gas communication paths in said panel between columns of cells and extending from each cell to the adjacent cell whereby, when a cell is ionized and fired and is glowing, excited particles and charged particles generated in the glowing gas diffuse through said paths to an adjacent cell which is not in a fired state and is not glowing, said particles serving to facilitate ionization and firing of said second cell when operating potentials are applied to its electrodes, the ionization and firing of said second cell being achievable at a potential somewhat lower than its characteristic firing potential due to the presence of said excited particles,

a plurality of cathode driver circuits, each coupled in common to a plurality of spaced-apart ones of said cathode electrodes associated with spaced-apart columns of cells in said panel, there thus being groups of columns of cells having their cathode electrodes connected to a separate common cathode driver circuit so that operating potential can be applied simultaneously to all of the cathode electrodes and the associated columns of cells of a group, each of the columns of cells of a group being spaced apart by a column of cells and cathode electrode of each of the other groups,

anode drive circuit means coupled to said anode electrodes for applying operating potential thereto as operating potential is applied to each cathode electrode,

said cathode and anode drive circuit means being operated to apply operating potential to the first column of cells which is thus ionized and caused to glow whereby excited particles are generated in the gas therein, and then to apply operating potentials to the cathode and anode electrodes associated with the un-ionized column of cells adjacent to said first column of ionized cells and to the other columns of cells of its group, only the column of cells adjacent to said ionized column of cells being ionized itself due to the fact that said gas communication paths serve to diffuse excited particles to the adjacent column of cells and not to other remote columns of cells of its group whereby said adjacent cell ionizes preferentially,

said anode drive circuit means including means for modulating the current flow through selected display cells to modulate the light output therefrom as each column of cells is fired.

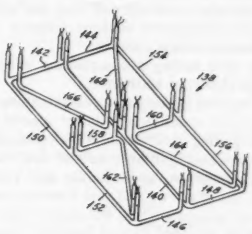
3,875,475

ILLUMINATING DEVICE OF THE ELECTRIC GASEOUS DISCHARGE TYPE

John M. Townsend, 13458 Grandview, Gibraltar, Mich. 48173

Filed Oct. 17, 1973, Ser. No. 407,191
Int. Cl. G09f 9/34
U.S. Cl. 315—193 **1 Claim**

1. An illuminating display device of the electric gaseous discharge type for permitting selective representation of a plurality of characters including letters from A to Z and arabic numerals from 0 to 9, comprising five elongated fluid-tight translucent gas filled tubes located in the same plane without one of the tubes crossing another tube, the first of said tubes being configured into the shape of a rectangle, with two of the sides of the rectangle being longer than the remaining two sides thereof, with a portion of said first tube being straight and extending from the center of one side of the rectangle to the center of the side opposite of said one side in a direction parallel to the two longest sides thereof, said portion of said first tube dividing the rectangle into a pair of sections, each section consisting of two quadrants, said first tube having two free ends, one end of said first tube being located near the center of said one side of the rectangle and the other end of said first tube being located near the center of the side opposite of said one side, an electrode being provided in each of said ends of said first tube and thus located near the center of said one and said opposite sides, additional electrodes being provided at each corner of said first tube, an electrode being provided centrally between each corner electrode, an electrode being provided centrally of said portion extending from the center of one side wall of the rectangle, and an electrode being provided at one juncture of said portion with a side wall, second and third elongated fluid-tight translucent gas filled tubes formed into a generally V-shape each having two ends, an electrode being provided at each end and at the apex of the V-shape of each of said second and third tubes, said second and third tubes each being positioned within a quadrant of one of the sections of the rectangle defined by the first tube, with one of the legs thereof extending from a point adjacent the center of one of the sides of said rectangle, the other leg of the V-shape extending to a point adjacent a corner of the rectangle defined by the first tube, and fourth and fifth generally straight elongated fluid-tight gas filled translucent tubes, an

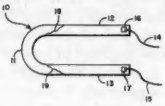


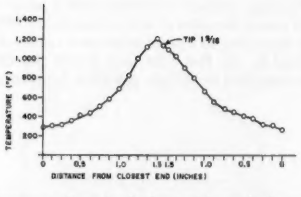
electrode being provided at each end of each of said fourth and fifth tubes, said fourth and fifth tubes being positioned within the remaining quadrants of the other of the sections of the rectangle defined by the first tube and extending diagonally from the center of the rectangle to the quadrant corner, said second and fourth tubes being located in one of the sections and said third and fifth tubes being located in the remaining section, all of said electrodes being located in projections extending in the same direction from said tubes, electrical means including a single step-up transformer provided for external electrical connection to each of the electrodes, application of a sufficient voltage to a pair of adjacent electrodes being operable to cause illumination of the gases between said electrodes, a low resistance shunt circuit connected across each pair of electrodes, and normally opened switch means in each of said shunt circuits, closure of any of said switch means preventing illumination of the gases between said electrodes when a voltage is applied thereto normally sufficient to cause illumination, said first, second, third, fourth and fifth tubes being connected to form a series circuit capable of illumination to display either letters or numerals, said switch means comprising magnetic relay means and means for remotely actuating said magnetic relay means, and said transformer having a secondary winding which is connected to the electrodes at each end of the series circuit.

3,875,476
IGNITER ELEMENT

William B. Crandall, Wheaton, and Linden E. Shipley, Evanston, both of Ill., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 10, 1974, Ser. No. 432,385
Int. Cl. F23q 7/10
U.S. Cl. 317—98 3 Claims





1. A continuous unitary body formed in a single segment, said body containing a plurality of heat and oxidation resistent, electrically conductive ceramic material compositions wherein said compositions comprise:

An igniting zone having a composition exhibiting a relatively high electrical resistance;

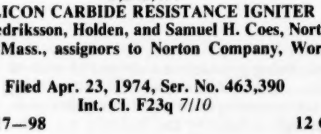
zones flanking said igniting zone, said flanking zones having a composition exhibiting a lower electrical resistance than said igniting zone; wherein the compositional transition between said igniting zone and said flanking zone is a gradual transition; and wherein said compositions of both said igniting zone and said flanking zones comprise principly of silicon carbide and pyrex-type glass; and

electrical leads attached to said flanking zones.

3,875,477
SILICON CARBIDE RESISTANCE IGNITER

John I. Fredriksson, Holden, and Samuel H. Coes, Northboro, both of Mass., assignors to Norton Company, Worcester, Mass.

Filed Apr. 23, 1974, Ser. No. 463,390
Int. Cl. F23q 7/10
U.S. Cl. 317—98 12 Claims

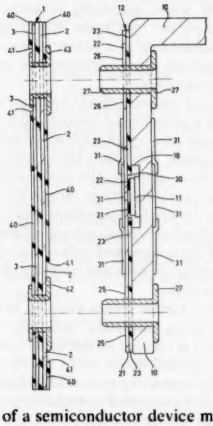


1. A ceramic resistance igniter, comprised of a pair of terminal connecting ends and a hot-zone extending therefrom and having a composition consisting essentially of from 95 to 99.9% by weight of silicon carbide, 0.05 to 0.50% by weight of aluminum, 0 to 4% by weight of silicon oxide, 0 to 0.25% by weight if iron or compounds thereof, a maximum of 100 parts per million of boron, and up to 0.25% by weight of miscellaneous impurities, said composition having been sintered and then exposed to a nitrogen atmosphere at a temperature of from 1,500°C to 2,000°C for 15 to 180 minutes.

3,875,478
SEMICONDUCTOR DEVICE ARRANGEMENTS

John Capstick, Southampton, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 12, 1973, Ser. No. 323,204
Claims priority, application United Kingdom, Jan. 12, 1972, 1390/72; May 5, 1972, 21029/72
Int. Cl. A05k 5/00
U.S. Cl. 317—101 CC 19 Claims



1. An arrangement of a semiconductor device mounted on a flexible service strip, in which the service strip includes at least two supply conductors, and the semiconductor device comprises a carrier, a semiconductor body secured to and encapsulated on part of the carrier, and a foil secured on the same face of the carrier as the semiconductor body, at least part of which carrier is of metal and provides a terminal connection to an electrode at the major surface of the semiconductor body secured thereto, which foil includes a layer of insulated electrical connection conductors, which connection conductors provide electrical connections between electrodes at the opposite major surface of the semiconductor body and other electrical terminals of the device, at least two of the terminals of the device being present as substantially flat contact areas at a face of the device facing the service strip, at least one of these flat contact area terminals being provided by an exposed part of the connection conductor layer of the foil which overlies a substantially plane part of the carrier surface and faces the service strip, connection areas of the supply conductors being in registration with the said flat contact area terminals of the device facing the service strip, and securing means securing the device against the service strip with the flat contact area terminals of the device in pressure contact with these connections areas of the supply conductors of the service strip.

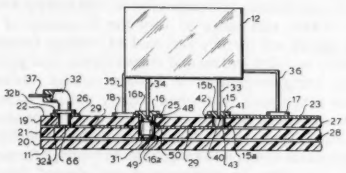
3,875,479
ELECTRICAL APPARATUS

Gilbert R. Jaggar, 702 Edwards Rd., Apt. 63, Greenville, S.C. 29607

Filed May 7, 1973, Ser. No. 358,069
Int. Cl. H05k 1/18
U.S. Cl. 317—101 CM 4 Claims

1. An electrical apparatus comprising a rigid laminated circuit board having opposite sides, a first electrically nonconductive layer having an internal surface located between said sides and imprinted with a flat electrically conductive lead

element, and a second electrically nonconductive layer having an internal surface which facially confronts the imprinted internal surface of the first layer, said board having a hole extending through said second layer and communicating with the exterior of the board at one of said sides, and said hole having an internal extremity defined by a contact surface area of said flat lead element; said apparatus further comprising a circuit component mounted on said board at said one of said



sides and having a lead wire electrically connected to said flat lead element by an electrically conductive metal connector which electrically interconnects said lead wire and said flat lead element and having a shank press fitted in said hole and in frictional engagement with said second layer, said shank having an end extremity in physical contact with said contact surface area, and said lead wire being in physical contact with said connector at said one of said sides.

3,875,480
MODULAR PUNCH DEVICE
LaVerne Frank Knappe, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 1, 1974, Ser. No. 456,587
Int. Cl. H01f *7/08, 7/18*
U.S. Cl. 317—123 **14 Claims**

1. A mechanical actuating device comprising a beam element;

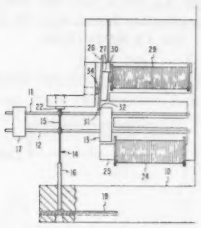
excitation means operatively connected to said beam element for imparting mechanical energy thereto as an oscillatory mechanical motion;

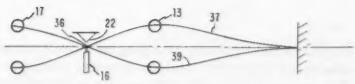
means controlling said excitation means for inducing a first mode of oscillatory motion in said beam including a node intermediate the ends of said beam when said beam is subject to a first condition of constraint;

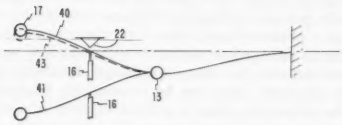
a moveable mechanical element carried by said beam and positioned at said node; and

selectively engageable means operable to engage said beam for imparting a second condition of constraint,

said second condition of constraint causing a second mode of oscillatory motion to be induced in said beam which

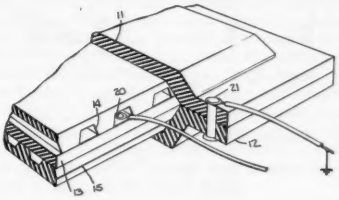






eliminates said node and causes said mechanical element to excursion through a work stroke.

3,875,481
CAPACITIVE WEIGHING MAT
Henry F. Miller, Clifton, N.J., and Jonathan Mishory, Birmingham, Mich., assignors to Uniroyal, Inc., New York, N.Y.
Filed Oct. 10, 1973, Ser. No. 405,216
Int. Cl. H01g *7/00*
U.S. Cl. 317—246 **27 Claims**



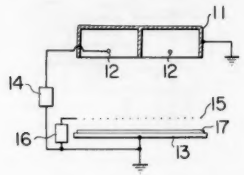
1. A weighing mat adapted to be loaded by a range of forces to be measured comprising:

at least two electrically conductive layers separated by a deformable dielectric layer, said deformable dielectric layer comprising projections individually having a cross-sectional shape having a first base near a first conductive layer and a second base near a second conductive layer, said first base being wider than the distance between said first and second bases and said projections individually having a substantially trapezoidal cross-sectional shape.

3,875,482
CHARGING CONTROL DEVICE

Koichi Noguchi, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Apr. 12, 1973, Ser. No. 350,361
Claims priority, application Japan, Apr. 19, 1972, 47-39827
Int. Cl. H01t 19/04
U.S. Cl. 317—262 A 4 Claims

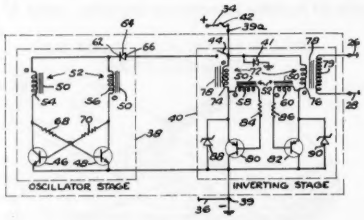


1. A device for controllably charging an object comprising corona discharge electrodes and an opposite electrode plate disposed in spaced juxtaposed relationship, a circuit for permitting either a positive element or a negative element of an AC voltage from an AC power source to flow from said corona discharge electrodes to said opposite electrode plate, and a circuit for permitting the other component of the AC voltage to flow in a predetermined value from the corona discharge electrodes to the opposite electrode plate whereby an object interposed between the corona discharge electrodes and the opposite electrode plate can be controllably charged, said circuit for permitting either a positive element or a negative element of an AC voltage from an AC power source to flow from said corona discharge electrodes to said opposite electrode plate consisting of a constant voltage passive element and a diode.

3,875,483
POWER SUPPLY FOR REFRIGERATION UNITS

James B. Farr, Ann Arbor, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Continuation of Ser. No. 214,644, Jan. 3, 1972, abandoned.
This application Aug. 20, 1973, Ser. No. 389,588
Int. Cl. H02p 9/44
U.S. Cl. 318—213 26 Claims

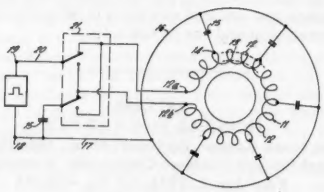


1. In a refrigeration system and power supply therefor of the type adapted for use in a mobile vehicle such as a camper, a trailer or the like, the combination comprising a refrigeration compressor driven by an AC induction motor, an evaporator coil and a condenser coil operatively connected to said compressor, a DC battery having a nominal battery output voltage that is subject to variation within a predetermined range according to the charge and the load on said battery, and inverter circuit means operably coupling said battery to said motor for energizing said motor with an AC voltage whose amplitude and frequency vary according to preselected functions of battery voltage, said inverter circuit means comprising amplitude control means and frequency control means, said amplitude control means comprising first and second switch means adapted to be alternately rendered conductive in response to first and second switching signals respectively, first output means operatively coupled to said first switch means and said battery so as to be energized when said first switch means is conducting to provide one polarity half cycle of said AC voltage, second output means operatively coupled to said second switch means and said battery so as to be energized when said second switch means is conducting to provide the opposite polarity half cycle of said AC voltage, said amplitude control means being responsive to battery voltage variations within said range for controlling said AC voltage amplitude such that when battery voltage increases within said range said AC voltage amplitude increases according to a first preselected function and when said battery voltage decreases within said range said AC voltage amplitude decreases according to said first preselected function, and wherein said frequency control means comprises signal generating means including oscillator means for generating said first and second switching signals, said signal generating means being coupled to said first and second switch means and also being connected to and powered by said battery and responsive to said battery voltage variations within said range to vary the frequency of said switching signals and thereby vary said AC voltage frequency developed by said first and second output means, said generating means being responsive to battery voltage variations within said range such that when battery voltage increases within said range said AC voltage frequency increases according to a second preselected function and when said battery voltage decreases within said range said AC voltage frequency decreases according to said second preselected function wherein said motor is efficiently operated at different torque loads at said compressor even though said battery voltage varies within said range.

3,875,484
TRAVELLING FIELD ELECTRIC MOTOR WITH IMPROVED STATOR

John Llewellyn Williams, Chester, and Ralph James Harte, Wallasey, both of England, assignors to British Nuclear Fuels Limited, Warrington, Lancashire, England

Filed Dec. 28, 1973, Ser. No. 429,210
Claims priority, application United Kingdom, Jan. 9, 1973, 1145/73
Int. Cl. H02p 1/44
U.S. Cl. 318—220 R 3 Claims



1. In an electric drive system including an alternating current electric motor having a stator, a stator core and a rotor arranged to be driven by energization of the stator winding from a single-phase alternating current supply, a stator arrangement comprising an inductive stator winding having two ends and an even number of tapping points at substantially equi-spaced intervals along its length, the same even number of capacitors associated with the inductive stator winding, a common connector, means for connecting each capacitor in parallel with a section of the winding between a respective tapping point and the common connector, and first and second electric current supply terminals, said first terminal being

connected to one end of the inductive stator winding and said second terminal being connected to the common connector; the inductive winding, the capacitors, and the frequency of the supply being so arranged and matched that, in operation, the wavelength of the winding current is equal to an even multiple of the said sections such that a travelling magnetic field is set up in the stator and the magnetic intensities at the two ends of the winding are equal.

3,875,485

SPEED CONTROL SYSTEM FOR A-C MOTORS, WHICH SLOWS MOTOR DOWN WHEN IN OVERSPEED CONDITION AND STOPS MOTOR WHEN IN UNDERSPEED CONDITION

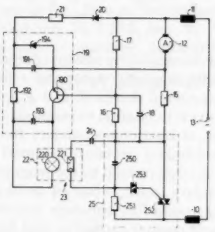
Friedrich Hornung, Stuttgart, Germany, assignor to Robert Bosch GmbH, Gerlingen-Schillerhohe, Germany

Filed Dec. 6, 1973, Ser. No. 422,267

Claims priority, application Germany, Mar. 10, 1973, 2312127

Int. Cl. H02k *27/20;* **H02p** *5/40*

U.S. Cl. 318—227 **12 Claims**



1. Control system for a-c electric motors in which the motor is designed for operation at a predetermined a-c supply voltage derived from an a-c source (**13**), the motor having an armature winding (**12**), said system comprising

a bridge network which includes three impedance arms (**15, 16, 17**) and the armature winding (**12**) as the fourth arm thereof, the impedance branches being dimensioned with respect to the armature winding and the supply voltage such that the bridge will be in balance at a predetermined supply voltage and at a predetermined command speed and provide a diagonal sensing voltage of effectively zero;

a phase angle control circuit (**25**) in series with the motor armature (**12**) controlling supply of power to the motor, the phase angle control circuit including at least one semiconductor switch (**252; 254, 255**), a timing capacitor (**250**) connected to the semiconductor switch and determining the firing angle thereof, a further capacitor (**24**) and a controllable variable resistor (**221, 222, 400**);

and a sensing circuit (**19**) sensing unbalance of the bridge which includes a threshold switch (**190, 191, 194**) having an upper threshold level (FIG. **2**: B) and a lower threshold level (FIG. **2**: D), the threshold switch being controlled by said bridge circuit and becoming conductive if either the upper, or lower threshold level thereof is passed upon unbalance of the bridge, the circuit being connected to and controlling said controllable variable resistor (**221, 222, 400**) to change resistance and thus decrease the timing constant of the phase angle control circuit and decrease the phase angle of firing from said angle as determined by said timing capacitor to thereby limit supply of power to the motor upon

a. change in supply voltage from the predetermined value in excess of the range which causes the threshold level of the threshold switch circuit to be exceeded upon unbalance of the bridge;

b. change in command speed in excess of a predetermined value;

c. change in command speed below a predetermined value.

3,875,486

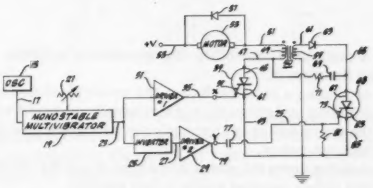
MOTOR SPEED CONTROL CIRCUIT

William J. Barton, 5949 Turnergrove, Lakewood, Calif.

Filed Oct. 12, 1973, Ser. No. 405,818

Int. Cl. H02p *5/06*

U.S. Cl. 318—341 **5 Claims**



1. A switching circuit responsive to two complementary constant frequency pulses of variable duration for the controlled application of DC power through a DC motor load, comprising:

a transformer having a primary and a secondary winding, said primary winding having one end thereof for connection through a DC motor load to a positive source of direct current power, one end of said secondary winding being connected to a common circuit ground, the polarity of said secondary winding being selected such that a current is conducted from said one end of said secondary winding in response to a current entering said one end of said primary winding;

a first controlled rectifier having an annode, a cathode, and a gate electrode, said annode being connected to the other end of said primary winding, said cathode being connected to said common circuit ground, said gate electrode and said common ground being adapted to be connected to a source of one of the two complementary constant frequency pulses of variable duration;

a diode having an annode and a cathode, said annode being connected to the other end of said secondary winding;

a second controllable rectifier having an annode, cathode, and a gate electrode, said cathode being connected to said common circuit ground, said annode being connected to the cathode of said diode;

a resistor connected between said gate electrode and said cathode of said second controllable rectifier;

a first capacitor having one end thereof connected to said gate electrode of said second controllable rectifier, the other end of said capacitor and said common ground being adapted to be connected to a source of the other of said two complementary constant frequency pulses of variable duration;

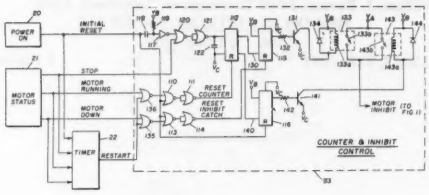
a second resistor having one end thereof connected to the annode of said first controllable rectifier; and

a second capacitor connected between the other end of said second resistor and the annode electrode of said second controllable rectifier.

3,875,487
METHOD AND APPARATUS FOR MOTOR-STARTING CONTROL

Laniel B. White, Corpus Christi, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed May 1, 1973, Ser. No. 356,262
Int. Cl. H02h 7/085
U.S. Cl. 318—485 3 Claims

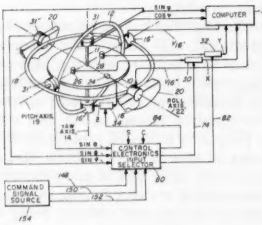


1. A method of controlling the operation of a motor, comprising the steps of:
   a. producing a pulse each time the motor shuts down,
   b. counting said pulses having sequentially occurred without the motor having continuously run for a given time period between pulses,
   c. shutting down the motor a first time when the number of said pulses counted equals a first number,
   d. automatically restarting the motor at the end of a given time delay, said time delay having begun when the motor was shut down,
   e. continuing the sequential counting of said pulses, and
   f. shutting down the motor a second time when the number of said pulses counted equals a second number.

3,875,488
INERTIALLY STABILIZED GIMBAL PLATFORM

Thomas H. Crocker, Burlington, and Barry N. Levitt, Framingham, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Feb. 15, 1973, Ser. No. 332,856
Int. Cl. B64c 17/02
U.S. Cl. 318—648 5 Claims

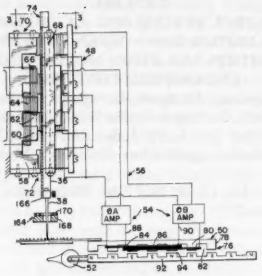


1. In an inertially stabilized gimbal platform system wherein a gimbal drive means is controlled through an electronic control section by the output of a gyro mounted on a platform in such system, such gyro having an electrical null position and, offset therefrom, a mechanical null position, to stabilize such platform, such electronic control section comprising:
   a. a control signal source means, for providing a control signal representative of the offset between the electrical null position and the mechanical null position; and
   b. means for combining the output signal of the gyro with the control signal to provide an output signal being coupled to the gimbal drive means.

3,875,489
LINEAR SELF SYNCHRONOUS ELECTROMAGNETIC DRIVE SYSTEM FOR A SEWING MACHINE

Joe W. Von Brimer, 3664 Vegas Plaza Dr., Las Vegas, Nev. 89102

Division of Ser. No. 114,233, Feb. 10, 1971, Pat. No. 3,735,717. This application Jan. 15, 1973, Ser. No. 323,949
Int. Cl. G05b 11/12
U.S. Cl. 318—691 5 Claims

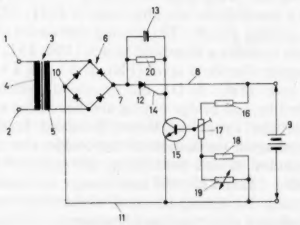


1. An electromechanical drive system comprising, in combination, a first electromagnetic stator and a first electromagnetic armature associated therewith and adapted to undergo a first movement cycle in relation to magnetic fields generated in said first stator, at least one secondary stator and at least one associated secondary armature adapted to undergo a movement sequence determined by the magnetic fields generated in said secondary stator, a pair of multi-phase windings mounted adjacent to said first armature, means comprising at least one permanent magnet carried on said first armature for generating control signals in said windings indicative of movement of said first electromagnetic armature, means comprising at least one amplifier responsive to said control signals in respective ones of said windings for supplying actuating current to said secondary stator whereby said secondary armature is driven in synchronism with said first armature.

3,875,490
BATTERY CHARGING EQUIPMENT HAVING A VOLTAGE DIVIDER INCLUDING A CAPACITOR AND TRANSISTOR

Karl Ackermann, Berlin, Germany, assignor to Robert Bosch Photokino GmbH, Stuttgart, Germany

Filed Apr. 16, 1974, Ser. No. 461,386
Claims priority, application Germany, May 23, 1973, 2326105
Int. Cl. H02j 7/10
U.S. Cl. 320—40 5 Claims



1. In equipment for charging a battery from an AC source furnishing an AC voltage, in combination, full wave rectifier means for rectifying said AC voltage and furnishing a corresponding pulsating DC voltage at a first and second DC output

terminal; electrical switch means having a main conductive circuit connected from said first DC output terminal to said battery and having a switch control electrode, for interrupting the charging current to said battery in response to a cut-off signal at said switch control electrode; a capacitor having a first terminal directly connected to said first DC output terminal and a second terminal directly connected to said switch control electrode; a variable impedance connected from said switch control electrode to said second DC output terminal, said variable impedance having an impedance control electrode, the impedance of said variable impedance varying as a function of the signal applied to said impedance control electrode; and additional circuit means for connecting said impedance control electrode to said battery in such a manner that the signal at said impedance control electrode corresponds only to the voltage across said battery.

3,875,491

ARRANGEMENT FOR SUPPLYING MULTI-PHASE ELECTRIC POWER CONSUMERS BY MEANS OF CONVERTERS

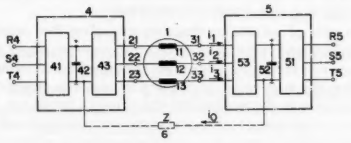
Ludwig Abraham, Mannheim, Germany, assignor to BBC Brown Boveri & Co., Baden, Switzerland

Filed July 24, 1973, Ser. No. 382,051

Claims priority, application Germany, July 26, 1972, 2236554

Int. Cl. H02m *5/44*

U.S. Cl. 321—5 **6 Claims**



1. Arrangement for supplying multi-phase power consumers by means of converters wherein the terminals of the various phases of the power consumer have no direct connection with each other, comprising a first multi-phase converter including rectifier and inverter units interconnected by an intermediate direct current circuit, a first multi-phase alternating current supply system feeding the input side of the rectifier unit of said first converter, connections extending between the output terminals of the various phases of the inverter unit of said first converter and corresponding first terminals of the various phases of the power consumer, a second multi-phase converter including rectifier and inverter units interconnected by an intermediate direct current circuit, a second multi-phase alternating current supply system independent of said first multi-phase alternating current supply system feeding the input side of the rectifer unit of said second converter, and connections extending between the output terminals of the various phases of the inverter unit of said second converter and corresponding second terminals of the various phases of the power consumer, said first and second converters being operable independently of one another whereby the output potentials of the inverter units of said converters are not fixed relative to each other by external circuit arrangements and can be allowed to develop unrestrictedly and whereby harmonic currents with an ordinal number divisible by three are suppressed.

3,875,492

CONTROL UNIT FOR A CONVERTER

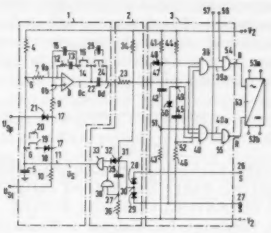
Erich Allert, Vienna, Austria, assignor to Siemens Aktiengesellschaft Osterreich, Vienna, Austria

Filed Apr. 15, 1974, Ser. No. 460,976

Claims priority, application Germany, Apr. 13, 1973, 2318806

Int. Cl. H02m *1/08*

U.S. Cl. 321—16 **10 Claims**



1. A control unit for a converter, which control unit includes an R-C circuit for generating a sawtooth voltage, means for synchronizing the sawtooth voltage with a synchronizing voltage, an operational amplifier used as a comparator and having the sawtooth voltage as its inverting input and a control voltage as its non-inverting input wherein the improvement comprises:

a. a diode coupling the sawtooth to the non-inverting input of the comparator with the cathode of said diode connected to the non-inverting input;

b. a first feedback circuit comprising a capacitor coupling the output of the comparator to its non-inverting input; and

c. a second feedback circuit comprising a second capacitor and a resistor in series coupling the comparator output to its inverting input.

3,875,493

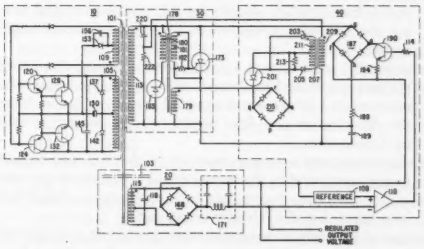
FERRORESONANT POWER CONVERTER WITH CONTROL OF INVERTER FREQUENCY AND SENSING OF SATURATION CONDITION

Frederick Francis Kunzinger, Parsippany, and Weyman Blanchard Suiter, Jr., Whippany, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 2, 1974, Ser. No. 457,219

Int. Cl. H02m *3/32;* **G05f** *1/56*

U.S. Cl. 321—18 **8 Claims**



1. A DC to DC converter comprising an inverter circuit having positive and negative half-cycles of oscillation, said inverter circuit including a transformer having a primary winding, a control winding, and a ferroresonant output winding, and a pair of transistor switches connected in push-pull arrangement with said primary winding; and first means for controlling the frequency of said inverter comprising a capaci-

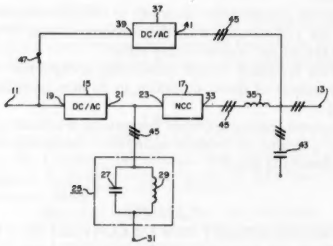
tor, feedback means connected from said output winding to said capacitor for charging said capacitor during each inverter half-cycle, switching means connected across said control winding and to said capacitor responsive to the capacitor voltage attaining a predetermined value for terminating said inverter half-cycle and for discharging said capacitor to a predetermined state, said feedback means comprising a controllable current source coupled with said capacitor across said control winding responsive to the output winding voltage for charging said capacitor during each inverter half-cycle, and second means connected to said switching means responsive to the termination of each inverter half-cycle caused by magnetic saturation of said transformer primary and control windings for turning on said switching means to discharge said capacitor to said predetermined state.

3,875,494

STATIC POWER CONVERSION ARRANGEMENT FOR CONVERTING DIRECT CURRENT POWER TO ALTERNATING CURRENT POWER

Laszlo Gyugyi, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 18, 1973, Ser. No. 380,329
Int. Cl. H03M *7/52*
U.S. Cl. 321—27 R **7 Claims**



1. A static power conversion arrangement for converting DC power to AC power comprising:

a first naturally commutated inverter adjusted to convey power from the DC side to the AC side thereof and having the DC side connected to the input of the arrangement;

a naturally commutated cycloconverter having the input thereof connected to the AC side of said first naturally commutated inverter and adjusted to convey power from the AC side of said first inverter to the output of said cycloconverter;

a reactive power source connected to the AC side of said first inverter and to the input of said cycloconverter, said source providing the voltage for commutation of said first inverter and said cycloconverter; and

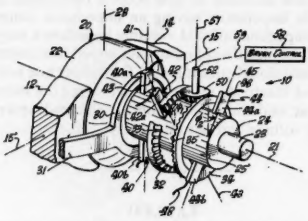
a second naturally commutated inverter adjusted to convey power from the DC side to the AC side thereof and having the DC side thereof connected to the DC side of said first inverter and the AC side thereof connected to the output of said cycloconverter, the AC signal at the output of said cycloconverter providing the commutation voltage for said second inverter, and the AC side of said second inverter being connected to the output of the arrangement.

3,875,495

DYNAMO-ELECTRIC ROTARY TRANSFORMER

Robert D. Middlebrook, Pasadena, Calif., assignor to Electric Motion Control Corporation International, Pasadena, Calif.

Filed May 7, 1973, Ser. No. 357,836
Int. Cl. H02m *3/40*
U.S. Cl. 321—28 **17 Claims**



1. Dynamo-electric apparatus for transforming direct current electric power between a constant supply voltage and a controllably variable output voltage, said apparatus including a rotor journaled on a rotor axis and having electrically coupled commutator means and armature winding means, substantially magnetically saturated field structure cooperating electromagnetically with the armature winding means, supply terminal means for connection to a source of direct current supply voltage, output terminal means for connection to external means for utilizing the direct current output voltage, and a set of primary brushes engaging the commutator means at electrically neutral angular position and electrically connected to the supply terminal means for producing rotor rotation, said apparatus further comprising

two sets of secondary brushes engaging the commutator means and mounted for rotary movement about the axis, control means for adjustably rotating the secondary brush sets through equal angles and in opposite directions with respect to the position of the primary brush set,

and circuit means connecting the secondary brush sets to the output terminal means for producing at said terminal means direct current voltages responsive to said control means and for normally supplying to said terminal means substantially equal secondary direct currents from the respective brush sets.

3,875,496

STATIC INVERTER USING MULTIPLE SIGNAL CONTROL LOOPS

Bruce W. Carsten, North Vancouver, B. C., Canada, assignor to Glenayre Electronics, Ltd., North Vancouver, B. C., Canada

Filed Mar. 13, 1974, Ser. No. 450,559
Int. Cl. H02m *7/20*
U.S. Cl. 321—44 **16 Claims**

1. A static inverter for supplying a regulated AC output signal to a load from a DC input signal, comprising:

means for generating an AC reference signal of predetermined magnitude;

means for generating a signal having a triangle-like waveform of selected frequency higher than said AC reference signal;

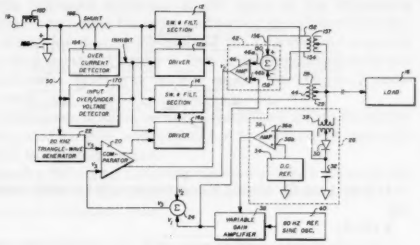
first circuit means, including means establishing a DC reference voltage and means for converting the AC output signal at the load to a corresponding DC voltage, which first circuit means adjust the magnitude of said reference signal in a manner proportional to the difference in magnitude between said converted AC output signal and said DC reference voltage;

second circuit means for comparing said adjusted reference signal and the AC output signal, and for generating an

error signal representative of the signal diffference therebetween;

signal summing means connected to said first and second circuit means for producing a corrected reference signal which is the algebraic sum of said error signal and said adjusted reference signal;

comparison means, responsive to said corrected reference signal and said signal having a triangle-like waveform, generating control signals whenever a predetermined



relationship exists between said corrected reference signal and said triangle-like signal exists;

switching and filtering means responsive to said control signals for converting the DC input signal to the AC output signal, said switching means intermittenly providing said filtering means with said DC input signal under the control of said control signals, generating a square wave thereby, said filtering means being responsive to said square wave to provide the AC output signal; and

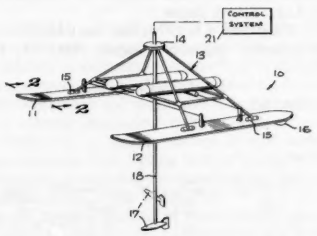
means for coupling said inverter output signal to the load.

3,875,497

WATERBORNE MAGNETIC ANOMALY DETECTION SYSTEM AND APPARATUS

Andrew Madsen, Alamo, Calif., assignor to Seatrek Ltd., Georgetown, Cayman Islands, British W. Indies

Filed Dec. 26, 1973, Ser. No. 427,518
Int. Cl. G01v *3/08*
U.S. Cl. 324—3 **1 Claim**



1. A waterborne search system for submerged articles comprising:

a surface platform movable over an extensive target search zone;

article responsive sensing means operably carried on said platform for detecting the presence of said articles;

control means carried on said platform and operably coupled to said sensing means for receiving signals from said sensing means upon detection of the articles and for transmitting said signals;

a control vessel carrying data reduction equipments operable to receive said sensed signals from said control means and for displaying said signals in a meaningful presentation;

said presentation being in the form of a visual chart display of magnetic anomalies;

remote control means interconnecting said platform and said control vessel for directing said platform to follow a series of parallel sequential transverses about said target search zone;

said sensing means including a pair of magnetometers trailing behind said platform in substantially fixed spaced apart relationship;

said control means carried on said platform and said data reduction equipments on said vessel constituting a data link and further including an observation aircraft in close proximity to said target search zone incorporated into said data link;

said platform comprising a self propelled boat remotely controlled and directed by said control vessel;

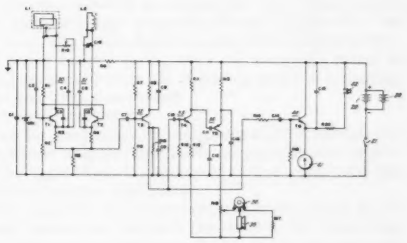
said platform comprising a pair of skis connected by braces so as to be in fixed parallel spaced apart relationship; and said platform further including pivot attachment between said braces and each of said skis and wherein each of said skis includes a concave underside adapted to stabilize directional movement.

3,875,498

METAL DETECTOR FOR DISTINGUISHING BETWEEN PRECIOUS METAL OBJECTS AND OTHER METAL OBJECTS

William A. Mahan, Dallas, and Lester A. Williams, Garland, both of Tex., assignors to D-Tex Electronics, Garland, Tex.

Filed Sept. 20, 1973, Ser. No. 399,444
Int. Cl. G01v *3/10*
U.S. Cl. 324—3 **7 Claims**



1. A detector including

first transistor oscillator means including a search inductor radiating radio frequency energy and adapted to be passed in proximity to an object to be detected;

second transistor oscillator means;

said first and second oscillator means each including a tank circuit tuned to a common resonant radio frequency; the transistors of said first and second oscillators being connected in a common base bias resistive network, and the output electrodes thereof being connected to a common mixer network;

said first oscillator including a resonant tank circuit consisting of a parallel connected inductor and capacitor; said tank circuit capacitor including a feedback capacitor connected in parallel with said transistor between said transistor emitter and collector electrodes; a variable resistor connected in parallel with said feedback capacitor; and said feedback capacitor and variable resistor providing a phase adjustment for said first oscillator;

a transistor detector means including a base bias resistive network independent from the common base bias resistive network for said oscillators; means including a capacitor connecting the output of said mixer network to said detector means base bias resistive network;

means coupling the output of said detector means to a transducer to produce a corresponding aural signal;

means coupling the output of said detector means to a transducer for producing a corresponding visual signal; and tuning means connected in one oscillator tank circuit for changing the phase angle of said one oscillator relative to the other oscillator, whereby said first and second oscillators unlock to produce a difference frequency at the mixer.

3,875,499

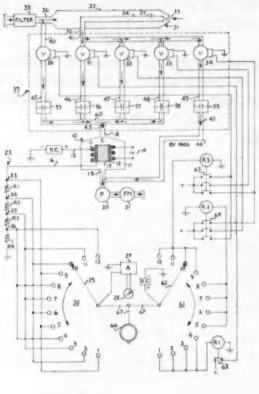
GAS DETECTING SYSTEM

John A. Roberts, Lynnfield, Mass., assignor to General Electric Company, Lynn, Mass.

Filed Dec. 26, 1973, Ser. No. 428,435

Int. Cl. G01n *27/00*

U.S. Cl. 324—33 **12 Claims**



1. A gas detector system comprising:

a. a gas leak detector sensitive to a particular gaseous substance to be detected,

b. a gas sampling probe through which a sample gas is drawn,

c. a source of diluent gas to which the detector does not respond,

d. conduit means connected to supply sample gas from said probe and diluent gas from said source to said detector,

e. a detector sensitivity control having a plurality of control positions,

f. valve means responsive to actuation of the sensitivity control from one operative position to another to alter the relative flow rates of the sample gas and the diluent gas through said conduit means in a discrete step and thereby change the ratio of sample gas to diluent gas reaching the detector; and

g. a bypass conduit arranged to bypass a portion of the gas flow from the probe around the gas detector so as to maintain the total gas flow through the detector relatively constant when the sensitivity control is activated to different control positions.

3,875,500

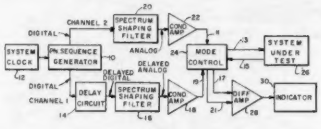
PSEUDO-NOISE TEST SET FOR COMMUNICATION SYSTEM EVALUATION

James C. Fletcher, Administrator of the National Aeronautics and Space Administration with respect to an invention of; Gabriel R. Wallace; William E. Salter; Glenn D. Weathers, all of Huntsville, Ala., and Sidney S. Gussow, Palm Bay, Fla.

Filed Nov. 28, 1973, Ser. No. 419,831

Int. Cl. G01r *27/00*

U.S. Cl. 324—57 PS **9 Claims**



1. A test set for testing a communications system comprising:

a clock;

a pseudo-noise sequence generator connected to the output of said clock to provide a digital signal;

a variable delay circuit connected to receive said digital signal and to provide a delayed digital signal;

a first spectrum shaping filter connected to receive said delayed digital signal and to provide a delayed analog signal;

a second spectrum shaping filter connected to receive said digital signal and to provide an analog test signal;

means for connecting said analog test signal to the communications system;

means for comparing two input signals and providing an output signal indicative of the differences in the signals; and

means for connecting the output of said communications system and the delayed analog signal to said comparing means.

3,875,501

PULSE WIDTH MODULATION TYPE RESISTANCE DEVIATION MEASURING APPARATUS

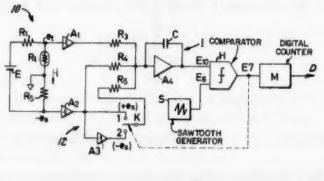
Eiji Hayashi, Tokyo, Japan, assignor to Yokogawa Electric Works, Ltd., Tokyo, Japan

Filed Nov. 13, 1973, Ser. No. 415,532

Claims priority, application Japan, Nov. 15, 1972, 47-114397

Int. Cl. G01r *27/02*

U.S. Cl. 324—62 **9 Claims**



1. A resistance deviation measuring device for determining the deviation of an unknown resistance from a predetermined resistance value by means of pulse width modulating type converter means having integrating means arranged to receive as inputs the sum of an unknown analog signal and either a positive or a negative reference signal, means for comparing the output of the integrating means with a comparison signal and for selecting between the positive and negative reference signals as a result of the comparison to zero the average value

of the input signals to the integrating means, and having digital counting means digitally measuring a time interval determined by the comparing means, the resistance deviation measuring device being characterized by:

a reference resistance;

means for generating the same current flow through the unknown resistance and the reference resistance to develop thereacross an unknown voltage and a reference voltage respectively;

means for applying the unknown voltage developed across the unknown resistance to the input of the integrating means to obtain the unknown analog signal input thereto; means for developing both of the positive and negative reference signal inputs to the integrating means from the reference voltage developed across the reference resistance; and

switch means responsive to the comparing means for applying said positive and negative reference signal inputs to the integrating means,

whereby the digital counting means digitally represents the deviation of the unknown resistance from a predetermined resistance value.

3,875,502
COIL ARRANGEMENT AND CIRCUIT FOR EDDY CURRENT TESTING

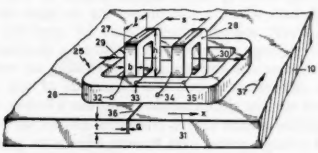
Peter Neumaier, Metzingen, Germany, assignor to Institut Dr. Friedrich Forster, Prufgeratebau, Reutlingen, Germany

Filed Mar. 13, 1974, Ser. No. 450,895

Claims priority, application Germany, May 24, 1973, 2326391

Int. Cl. G01r *33/12*

U.S. Cl. 324—37 **23 Claims**



1. An arrangement of test coils for scanning for defects the surface of a metallic workpiece moving in a predetermined direction relative to said arrangement of test coils comprising:

excitation coil means adapted to be coupled to the surface of the metallic workpiece and responsive to being energized with alternating current producing a homogeneous alternating magnetic field over at least a portion of said surface, said alternating magnetic field having lines of force which penetrate said surface substantially perpendicularly and cause the flow of eddy currents in the workpiece;

sensing coil means including at least a pair of spaced substantially identical sensing coils coupled electrically in a voltage subtractive relation disposed within the range of said alternating magnetic field in proximity to said surface, said sensing coils having their coil axes oriented in a direction substantially perpendicular to said predetermined direction and substantially perpendicular to the direction of said lines of force, and

the spacing between said sensing coils along the direction of their coil axes being adjusted to be approximately equal to twice the distance between the loci of the two maximum voltage signals occurring across the winding of one of the sensing coils responsive to the existence of said eddy currents and relative motion between said one sensing coil and said workpiece surface in the direction of said coil axes and said one sensing coil passing over a defect extending substantially transverse to said sensing coil axes,

whereby to provide responsive to energizing said excitation coil means and said sensing coils passing over such a defect in said predetermined direction an output signal across the terminals of the sensing coil means forming said pair.

3,875,503
DUAL SLOPE TYPE RESISTANCE DEVIATION MEASURING APPARATUS

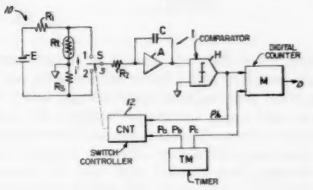
Eiji Hayashi, Tokyo, Japan, assignor to Yokogawa Electric Works, Ltd., Tokyo, Japan

Filed Nov. 13, 1973, Ser. No. 415,533

Claims priority, application Japan, Nov. 15, 1972, 47-114396

Int. Cl. G01r *27/02*

U.S. Cl. 324—62 **8 Claims**



1. A resistance deviation measuring device for determining the deviation of an unknown resistance from a predetermined resistance value with dual slope type converter means having integrating means for first integrating an unknown analog signal for a predetermined time period and for then integrating a reference signal of inverse polarity with respect to the analog signal until the integrating means is restored to its initial value, and having digital counting means digitally measuring a time interval ending when the integrating means is restored to its initial value, the resistance deviation measuring device being characterized by:

a reference resistance;

means for generating the same current flow through the unknown resistance and the reference resistance to produce thereacross the unknown analog signal and the reference signal respectively;

switch means for first connecting the analog signal developed across the unknown resistance to the integrating means for said predetermined time period and then connecting the reference signal developed across the reference resistance with inverse polarity to the integrating means until it is restored to its initial value; and

means for initiating the time interval measured by the digital counting means a predetermined amount of time after the reference signal is connected to the integrating means,

whereby the digital counting means digitally represents the deviation of the unknown resistance from a predetermined resistance value.

3,875,504
APPARATUS FOR CONTINUOUSLY DETERMINING THE MOISTURE CONTENT OF A MOVING ORE BED

Frederick Mercer Bodycomb, Jr., Flemington, and James Julius Barna, Somerville, both of N.J., assignors to Johns-Manville Corporation, New York, N.Y.

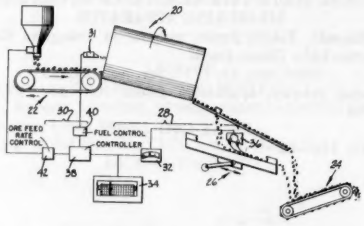
Filed Feb. 17, 1972, Ser. No. 227,088

Int. Cl. G01r *27/02*

U.S. Cl. 324—65 R **2 Claims**

1. An apparatus for measuring the moisture content of a moving mineral ore bed comprising a first conveyor means for moving the ore bed, a conductivity meter, first and second electrodes connected to said conductivity meter, said electrodes having surfaces for contacting the surface of a moving ore bed, said contact portions being a fixed relative distance

apart, the improvement comprising diverter means to divert a small portion of the moving ore bed from said first conveyor means to form a moving ore bed on an ore sample conveyor, each of said electrodes having a convex surface portion of equal curvature, the electrodes being pivotally mounted at one end to enable the convex surfaces of said electrodes to ride on the surface of the moving ore bed on said ore sample



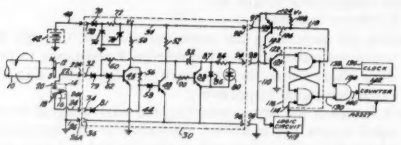
conveyor, each electrode having an upper section which is pivotally mounted and a lower section with said convex surface portion thereon, said lower section being separably secured to said upper section to facilitate the replacement of said lower section when required, and each of said electrodes being provided with a stop means to prevent said electrodes from pivoting into contact with said ore sample conveyor when there is no ore on the ore sample conveyor.

3,875,505

DATA COLLECTION SYSTEM AND APPARATUS SUITABLE FOR USE THEREIN

Joshua I. Goldberg, Swarthmore, Pa., assignor to The Boeing Company, Seattle, Wash.

Filed May 29, 1973, Ser. No. 364,840
Int. Cl. G01r *27/22*
U.S. Cl. 324—94 **8 Claims**



1. Apparatus for accumulating, storing, and reading out a quantity representative of the number of occurrences of specified events, comprising:

an electrochemical storage member containing a pair of electrodes and a plating material, said member being responsive to a current therethrough in one direction to plate said material from one of said electrodes onto the other of said electrodes and responsive to a current therethrough in the opposite direction to deplate said material from said other electrode and plate it onto said one electrode the same voltage source being employed to produce said plating and deplating currents;

means responsive to occurrences of said events for passing a predetermined amount of charge through said member in said one direction in response to each of said occurrences, thereby partially to deplate said one electrode and plate said other electrode;

means for passing a reading current of predetermined mined substantially-constant intensity through said member in said opposite direction after said partial deplating of said one electrode has occurred, thereby to institute deplating of said other electrode and plating of said one electrode;

means for terminating said reading current promptly in response to an increment in the voltage across said electrochemical member small compared with the increase in said voltage corresponding to zero current through said member, said increment occurring when said other electrode is nearly but not completely deplated; and

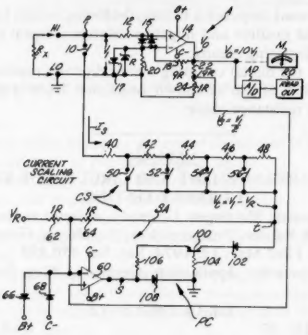
means for producing indications of the duration of said reading current.

3,875,506

ELECTRONIC PROTECTIVE CIRCUIT

Pieter G. Cath, Cleveland, and Robert J. Erdman, Solon, both of Ohio, assignors to Keithley Instruments, Inc., Solon, Ohio

Filed Dec. 27, 1973, Ser. No. 428,744
Int. Cl. G01r *1/36, 27/14*
U.S. Cl. 324—110 **4 Claims**



1. An electronic protective circuit for protecting electrical measuring circuitry from damage due to an overvoltage applied thereto wherein said measuring circuitry includes constant current source circuit means for applying a constant current through an unknown resistor to develop a voltage signal thereacross and means for providing an output indication in dependence upon the magnitude of said signal, said constant current circuit means comprises a known resistor and an amplifier means having an output circuit for providing an output voltage across said known resistor to provide a said constant current, said protective circuit including voltage limiting means for limiting the magnitude of the voltage on the input circuit of said amplifier means to a given maximum voltage level when an overvoltage is applied across said constant current circuit, and current limiting means connected in series with said output circuit and said known resistor for limiting the magnitude of current flowing in said series circuit to a given maximum current level.

3,875,507

POWER SUPPLY WITH AUTOMATIC SCALE CHANGING CAPABILITIES

Sigmund Borax, 6 Pickett Rd., Lincoln Park, N.J. 07035, and Stanley Chait, 522 E. 85th St., New York, N.Y. 10028

Filed Dec. 26, 1973, Ser. No. 427,651
Int. Cl. G01r *15/08*
U.S. Cl. 324—115 **17 Claims**

1. A power supply with automatic scale changing capabilities comprising:

an electrical power source, connectable to a load;

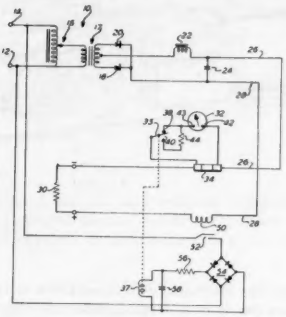
a current measuring instrument connected for measuring the current to said load, said instrument having a plurality of scales for measuring different current ranges;

first switching means for switching among said scales at said instrument;

a reed switch connected to actuate said first switching means;

current-carrying means connected to carry a current proportional to that through said load, said means being

positioned with respect to said reed switch such that the magnetic field generated by said means is linked to said switch for actuating same, whereby said reed switch is actuated and de-actuated at a predetermined current



through said load, to in turn actuate said first switching means to change said instrument scale; and

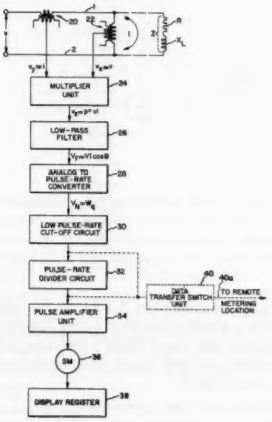
an RC circuit means actuating the first switching means and responsive to actuation of the reed switch for reducing the effects of indeterminate closing at said reed switch.

3,875,508

METERING ELECTRICAL ENERGY (KWH) IN SINGLE PHASE SYSTEMS

Miran Milkovic, Schenectady, N.Y., assignor to General Electric Company

Filed Sept. 7, 1973, Ser. No. 395,142
Int. Cl. G01r *21/00*
U.S. Cl. 324—142 **10 Claims**



1. A method for metering electrical energy in an a.c., single phase, two line, f_L hertz system comprising:

producing a first analog signal of f_L hertz representative of electrical current flowing in said system,

producing a second analog signal of f_L hertz representative of electrical voltage in said system,

multiplying said first and second analog signal to produce a third analog signal representative of electrical power in said system,

converting said third analog signal to a series of quantized signals, the signal repetition rate of said series of quantized signals being proportional to said power and each quantized signal representing a constant predetermined unit of energy in said system,

rejecting those quantized signals which occur at a repetition rate below a preselected repetition rate, and

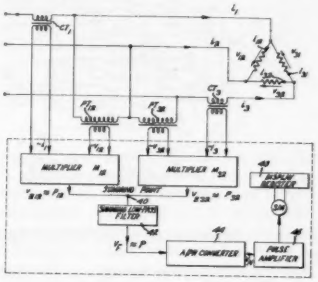
counting only the non-rejected quantized signals which occur at a repetition rate above said preselected repetition rate thereby accurately metering said electrical energy.

3,875,509

ELECTRONIC METERING OF ACTIVE ELECTRICAL ENERGY

Miran Milkovic, Scotia, N.Y., assignor to General Electric Company

Filed May 17, 1973, Ser. No. 361,030
Int. Cl. G01r *21/00, 11/32*
U.S. Cl. 324—142 **40 Claims**



1. A method of metering active electrical energy in a polyphase, N line system comprising:

measuring current in at least (N–1) of said lines and measuring at least (N–1) different line voltages;

producing a first plurality of at least (N–1) analog signals representing currents measured in the (N–1) lines and producing a second plurality of at least (N–1) analog signals representing the different (N–1) line voltages measured;

pairing different ones of the current analog signals of the first plurality with different ones of the voltage analog signals of the second plurality such that the different (N–1) pairs are representative of the instantaneous power in different parts of said polyphase system;

converting each of the (N–1) pairs of analog signals to a different one of an (N–1) series of consecutive signals, each signal in each of the (N–1) series representing instantaneous power in a different part of said system;

summing all the signals having the same consecutive position in all of the (N–1) series to provide an Nth series of consecutive signals, each representing instantaneous power in the whole system;

converting said Nth series of signals to a signal representing average power in the whole system;

converting the average power signal to another series of quantized signals, each representing a constant amount of active electrical energy;

wherein said polyphase system operates at a frequency f_L hertz and wherein each series of consecutive signals representing instantaneous power in different parts of said system includes consecutive first through kth signals, which signals occur at the constant signal repetition rate f_S and $k = f_S/f_L$ where $f_S < f_L$, wherein each of the first through kth signals is a bipolar pulse having the overall pulse width $T_S = 1/f_S$, each bipolar pulse having positive and negative polarity portions of widths T_A and $(T_S - T_A)$, respectively, the ratio T_A/T_S of each bipolar pulse being representative of instantaneous line voltage and the averaged amplitude of the positive and negative polarity pulse

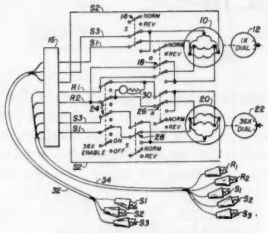
portions taken over the duration $T_S = 1/f_S$ being proportional to the mathematical product of said instantaneous line voltage and said instantaneous line current; and

wherein said signal representing average power in the whole system is a variable-amplitude continuous unipolar signal.

3,875,510
SYNCHRO TESTING CALIBRATING DEVICE

Jerome R. Beauchane, Del Mar, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 5, 1973, Ser. No. 405,718
Int. Cl. G01R *31/02*
U.S. Cl. 324—158 SY **2 Claims**



1. An improved synchro testing and calibrating device comprising:

a. a first synchro receiver having a single speed indicator dial,

b. a second synchro receiver having a thirty-six speed indicator dial,

c. cable connector means adapted to be connected to a synchro system under test, said cable connector means including a first set of three stator winding leads for connection to single speed servos, a second set of three stator winding leads for connection to thirty-six speed servo and a pair of common reference voltage leads,

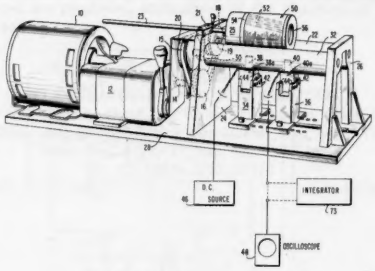
d. switch circuit means connected to said cable connector means and to said first and second synchro receivers for selectively connecting either of said receivers to said synchro system under test for calibrating and line testing and including means for reversing two stator leads of each set of stator leads and for separately reversing the reference voltage leads of both synchro receivers.

3,875,511
APPARATUS AND METHOD FOR TESTING DYNAMOELECTRIC MACHINE ROTORS

Marion W. Sims, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Filed Dec. 20, 1971, Ser. No. 209,872
Int. Cl. G01r *31/06, 33/12*
U.S. Cl. 324—158 MG **7 Claims**

1. A method of testing for defects in the conductive bars of a squirrel cage rotor for an induction machine in which the conductive bars extend axially along the rotor and are interconnected at the ends thereof by conductive means, the method comprising the steps of: supporting the rotor for rotation on at least one roller having a surface adapted for supporting an outer peripheral surface of the rotor generating a magnetic field with magnetic field means adjacent to the conductive bars; relatively moving the rotor and the magnetic field and thereby sequentially inducing a voltage in the conductive bars as they relatively move into and out of alignment with the magnetic means and thus causing current to flow therealong; and sequentially sensing the magnetic flux associated with current flow through each of the conductive bars with sensing means positionable relative to the periphery of the rotor so as to adjustably align the sensing means and the magnetic field means with a given conductive bar to sense

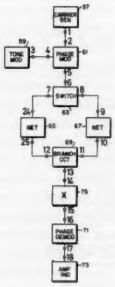


magnetic flux associated with current flow in a given bar while the given bar is in at least approximate alignment with the magnetic field means.

3,875,512
METHOD AND CIRCUIT ARRANGEMENT FOR MEASURING AM TO PM CONVERSION

Andras Baranyi, and Tamas Sarkany, both of Budapest, Hungary, assignors to Hewlett-Packard Limited, West Lothian, Scotland

Filed Oct. 3, 1973, Ser. No. 402,926
Claims priority, application Hungary, Oct. 11, 1972, TA 1214; United Kingdom, Jan. 1, 1973, 00825/73
Int. Cl. G01r *15/00*
U.S. Cl. 325—67 **12 Claims**



10. Apparatus as in claim **8** wherein said other signal channel also has a transfer function with a frequency independent amplitude response and a linearly frequency dependent group delay response and both group delay responses have equal but opposite slope values.

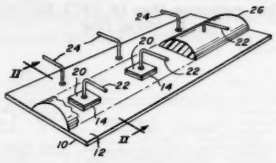
3,875,513
ANTENNA-COUPLED SOLID-STATE MICROWAVE GENERATOR SYSTEMS CAPABLE OF PRODUCING COHERENT OUTPUT RADIATION

Gene Strull, Baltimore; Herbert Cooper, Hyattsville, and Charles Herbert Grauling, Jr., Ellicott City, all of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 15, 1970, Ser. No. 46,380
Int. Cl. H03b *7/00*
U.S. Cl. 325—105 **7 Claims**

1. A solid-state microwave generator system comprising a plurality of adjacent semiconductor oscillator devices, means

for connecting driving potential means across all of said devices whereby the devices will exhibit negative resistivity and produce oscillations, and an antenna coupled to each of said



devices, the spacing between said antennas being such that their radiation fields will overlap and the frequencies of oscillation of said devices will be locked together at one coherent frequency.

3,875,514

CIRCUIT FOR SWITCHING THE AUDIO FREQUENCY OUTPUT IN AN AM-FM BROADCAST RECEIVER

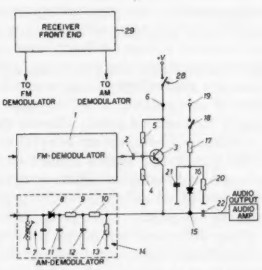
Eberhard Klein, Hildesheim, Germany, assignor to Blaupunkt-Werke GmbH, Hildesheim, Germany

Filed Apr. 26, 1974, Ser. No. 464,557

Claims priority, application Germany, May 23, 1973, 232614

Int. Cl. H04b *1/06*

U.S. Cl. 325—316 **15 Claims**



1. Circuit arrangement for switching the audio frequency (AF) in a combined AM-FM broadcast receiver having AM and FM demodulators, the AM demodulator having an output load resistor from which the output of the AM demodulator is obtained and a demodulator diode coupled to the load resistor, the switching circuit arrangement comprising:

an emitter follower amplifier including at least one transistor, the emitter electrode of said emitter follower transistor being coupled to said load resistor of said AM demodulator, said load resistor serving as the emitter resistor of said transistor;

means coupling the output of the FM demodulator to the base electrode of said emitter follower transistor;

the output from the emitter of the emitter follower transistor including an audio signal; and

control means coupled to said emitter follower transistor for respectively saturating and cutting off said emitter follower transistor by changing the base-emitter junction bias accordingly so that (1) the FM signal is obtained from the emitter of said emitter follower transistor, and the demodulator diode of the AM demodulator is blocked by the emitter voltage when said emitter follower transistor is saturated, and (2) the AM signal is obtained from the emitter of said emitter follower transistor, and the FM signal is cutoff when the emitter follower is blocked.

3,875,515

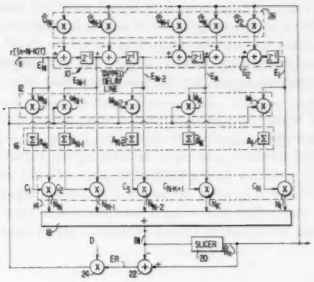
AUTOMATIC EQUALIZER WITH DECISION DIRECTED FEEDBACK

Richard L. Stuart, Beltsville, and Steven A. Tretter, Silver Spring, both of Md., assignors to Rixon Inc., Silver Spring, Md.

Filed June 19, 1973, Ser. No. 371,510

Int. Cl. H03k *5/18*

U.S. Cl. 325—323 **9 Claims**



1. An automatic equalizer for the receiver of a digital data system, said equalizer comprising a tapped delay line having an input connected to receive the baseband output of the receiver demodulator, and a plurality of outout taps; means for combining the outputs at the output taps of the delay line at the symbol time to produce an output B1; means for quantizing the output B1 to the nearest transmitted level B_n where B_n is the symbol transmitted at time nT and T is the symbol period; and feedback means including multiplying means for multiplying the B_n output of the quantizing means with estimated impulse response samples for each tap of the delay line and means for subtracting the output of each multiplying means from the data at the corresponding tap of the delay line to cancel the intersymbol interference caused by the decoded symbol on the future decoded symbol.

3,875,516

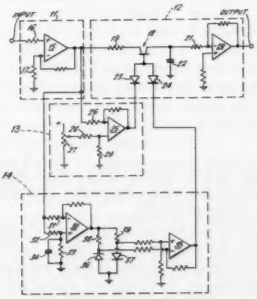
DISCRIMINATOR CIRCUITS

Alan John Thomas, Petersham, Richmond, England, assignor to The Rank Organisation Limited, London, England

Filed Oct. 26, 1973, Ser. No. 410,218

Int. Cl. H03k *5/00*

U.S. Cl. 328—146 **9 Claims**



1. A discriminator circuit having input means for receiving an information signal, an output means, and means for passing to said output means at least selected parts of said information signal received at said input means, said discriminator circuit comprising:

controlled switching means connected between said input means and said output means and operative when open to pass to said output means said information signal received at said input means and when closed to block said information signal from said output means, said controlled switching means having a control gate for receiving signals for opening and closing said controlled switching means,

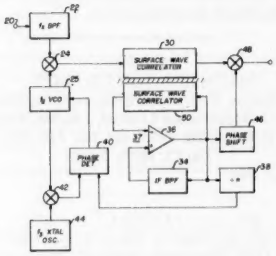
first signal sensitive means connected to receive said information signal from said input means and connected to said control gate, said first signal sensitive means being sensitive to the magnitude of said information signal and operating to provide a control signal to close said controlled switching means when said magnitude of said information signal lies to a selected side of a reference level,

second signal sensitive means connected to receive said information signal from said input means and connected to said control gate, said second signal sensitive means being sensitive to the rate of change of said information signal and operating to provide a control signal to close said controlled switching means when said rate of change of said information signal exceeds a given value.

3,875,517
TRACKING PHASE DETECTOR FOR SURFACE WAVE CORRELATORS

Douglas M. Dilley, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 26, 1973, Ser. No. 419,183
Int. Cl. H03b *3/04*; H03d *3/16*
U.S. Cl. 328—155 **6 Claims**



1. In a circuit for processing phase coded signals having a surface wave correlator whose frequency characteristics vary with variations in temperature:

a. a surface wave correlator having input means for receiving signals to be processed and having an output,

b. circuit means coupled to said surface wave correlator for sensing the change in frequency characteristics of said correlator due to temperature change and generating an output signal,

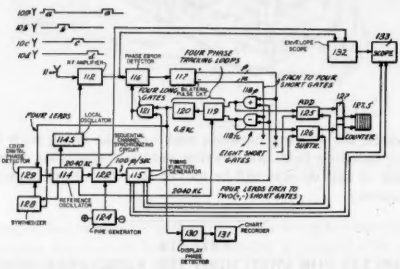
c. a reference signal source,

d. comparison circuit means coupled to said circuit means and to said reference signal source for generating a correction signal to compensate for said sensed change in characteristics.

3,875,518
PULSE-OPERATED RECEIVER

Charles E. Odams, Londonderry, N.H., assignor to American Standard Inc., New York, N.Y.

Division of Ser. No. 889,368, Dec. 31, 1969, Pat. No. 3,818,477. This application May 10, 1973, Ser. No. 358,892
Int. Cl. H03b *3/04*
U.S. Cl. 328—155 **3 Claims**



1. A control system having a matching means for matching the phase of local signal generator output pulses to the phase of control signal pulses including means for defining phase differences in terms of discrete pulses generated only during the presence of said phase differences, the number of pulses representing the respective phase differences, said phase-difference defining means comprising an input, a sawtooth-wave, signal generator which has its output frequency controlled by the magnitude of a control voltage at said input, and the polarity of the output sawtooth-wave controlled by the polarity of said control voltage, differentiator means for said output sawtooth-wave signal for producing pulses of corresponding frequency and polarity, and separating means for directing pulses of one polarity to a first point and pulses of the other polarity to a second point, wherein the local signal pulses have a frequency which is an integral multiple of the frequency of the transmitted signals applied to said matching means and wherein said matching means comprises for inserting and deleting said phase difference defining pulses into and from said local signal pulses respectively depending on the sense of the phase difference and means for frequency dividing said local signal pulses with insertions and deletions by said integral multiple so as to obtain a phase-adjusted signal at the transmitted signal frequency to compare therewith for phase difference, thereby providing a phase adjusted comparison signal.

3,875,519
RATIO COMPUTING CIRCUIT

Carlton J. Warren, Webster, N.Y., assignor to Sybron Corporation, Rochester, N.Y.

Filed Dec. 17, 1973, Ser. No. 425,256
Int. Cl. G06g *7/16*
U.S. Cl. 328—161 **8 Claims**

1. A ratio computer comprising:

automatic gain control circuit means having a signal input circuit, a signal output circuit, and a gain control input circuit;

circuit means for receiving periodically recurring cycles of signals, each cycle including a reference signal and at least one input signal;

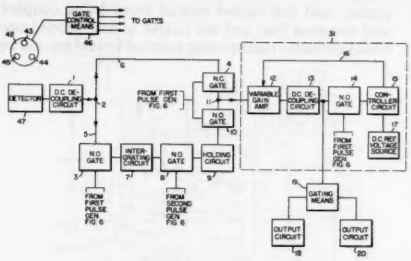
a computer output circuit;

first gating circuit means synchronized to said periodic signals for alternately connecting the signal output circuit to said gain control input circuit and to said computer output circuit;

second gating circuit means receiving said periodic signal and synchronized thereto, for storing a signal that is a function of the magnitude of a parameter of the received

reference signal and applying the stored signal to said signal input circuit during a subsequent cycle of said periodic signals while said first gating circuit means connects said signal output circuit to said gain control input circuit, and

third gating circuit means receiving said periodic signals and synchronized thereto for applying said input signal to said



signal input circuit while said first gating circuit means connects said signal output circuit to said computer output circuit so that the signal at the computer output circuit is a ratio of the magnitude of the parameter of said input signal that corresponds to said reference signal parameter relative to the magnitude of said reference signal parameter of the prior cycle to the periodic signals.

3,875,520

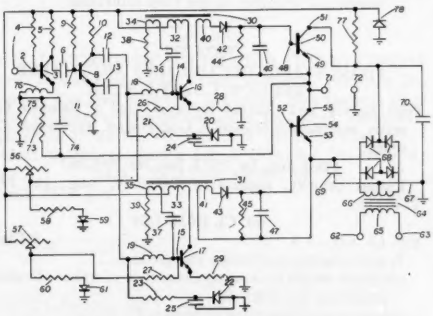
AUDIO FREQUENCY AMPLIFIER

John Charles Rankin, 1304 Sherman Way, North Hollywood, Calif. 91605

Filed Jan. 14, 1972, Ser. No. 217,740

Int. Cl. H03f *3/38*

U.S. Cl. 330—10 **3 Claims**



1. An audio frequency amplifier consisting of a first oscillator which includes a first tank circuit with a first secondary winding with one end of said first secondary winding connected to one terminal of a first diode detector and the second terminal of said first diode detector connected to one terminal of a first load resistor and the second terminal of said first load resistor connected to the second end of first secondary winding with said first load resistor connected between the base and emitter of the first transistor of a single ended push pull output stage, a second oscillator which includes a second tank circuit with second secondary winding with one end of said second secondary winding connected to one terminal of a second diode detector and the second terminal of said second diode detector connected to one terminal of a second load resistor and the second terminal of said second load resistor connected to the second end of said second secondary winding with said second load resistor connected between the base and emitter of the second transistor of said single ended push pull stage, means for applying the audio signal to be amplified to the base and emitter of said first and said second oscillators to amplitude modulate and overmodulate each said first and and said second oscillator thereby the detected voltage across said first load resistor is one half of the said audio signal sine wave and the detected voltage across said second load resistor is the second half of said audio signal sine wave with the two said halves of the said audio signal sine wave combining as a sine wave at the output terminal of said single ended push pull stage.

3,875,521

AUTOMATIC GAIN CONTROL CIRCUIT

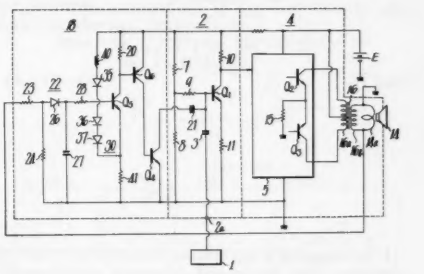
Masafumi Kikuchi, and Masashi Takeda, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sept. 21, 1972, Ser. No. 291,072

Claims priority, application Japan, Sept. 23, 1971, 46-86973

Int. Cl. H03f *3/30*

U.S. Cl. 330—29 **4 Claims**



1. An automatic gain controlled amplifier circuit comprising:

A. a power supply to furnish voltage to operate said circuit;

B. an amplifying circuit connected to said power supply to be energized thereby and comprising input and output circuits;

C. detector means connected to said output circuit of said amplifying circuit to produce a detected signal the amplitude of which corresponds to the magnitude of the amplified signal at said output circuit;

D. variable impedance means connected to said input circuit of said amplifying circuit and operative to vary the gain of said amplifying circuit;

E. a transistor comprising a pair of input electrodes comprising a biasing electrode and the other of said electrodes comprising a signal input electrode connected to said detector means to produce an automatic gain control signal in response to detected signals derived from said detector means and of excessive amplitude relative to a bias voltage between said electrodes;

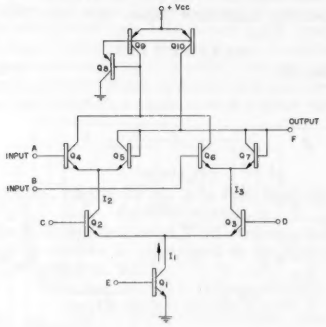
F. a voltage divider connected across said power supply and comprising non-linear circuit means connecting said biasing electrode of said transistor to one terminal of said power supply and an impedance connecting said biasing electrode to a second terminal of said power supply for varying the magnitude of bias voltage applied to said biasing electrode in accordance with any change in the voltage of said power supply such that, when the voltage of said power supply is reduced, said non-linear circuit means applies a bias voltage to said transistor biasing electrode that is smaller in magnitude than the proportional reduction in the power supply voltage, thereby to stabilize the operation of said transistor with respect to changes in the detected signal applied to said signal input electrode of said transistor; and

G. means connecting an output circuit of said transistor to said variable impedance means to control said variable impedance means in response to the m agnitude of the signal at said output circuit to minimize the distortion of said amplifying circuit by reducing the gain of the amplifying circuit for excessive high-amplitude audio signals.

3,875,522
INTEGRATED DIRECT-COUPLED ELECTRONIC ATTENUATOR

Werner H. Hoefi, San Jose, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Filed Apr. 13, 1973, Ser. No. 351,030
Int. Cl. H03f *3/68*
U.S. Cl. 330—30 D **4 Claims**



1. An integrated direct coupled electronic attenuator circuit comprising: first and second differential amplifiers each including a pair of transistors and each transistor having an input control terminal and first and second output terminals, said first output terminals of each pair of transistors being tied together at least one of said input control terminals receiving an ac input signal; a common constant current source, first and second switching means for coupling said constant current source to said tied pairs of said first output terminals, said switching means including means for selectively controlling the partitioning of said constant current between said first and second differential amplifiers; and load means coupled to the second output terminals of said differential amplifiers for concurrently receiving current from said constant current source which has been conducted through both said first and second differential amplifiers.

3,875,523
AMPLIFIER CIRCUIT FOR GRAPHICAL RECORDER

John M. Wade; Donald W. Huff, both of Poway, and Jeffrey D. Furman, San Diego, all of Calif., assignors to Hewlett-Packard, Company, Palo Alto, Calif.

Filed May 21, 1973, Ser. No. 362,564
Int. Cl. H03f *1/00*
U.S. Cl. 330—69 **7 Claims**

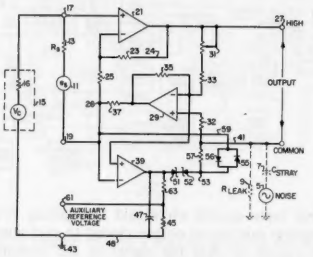
1. An amplifier circuit for eliminating the current flow into and out of the input terminals thereof resulting from a common mode voltage source in the signal source applied to the input terminals, and from a noise source voltage coupled in through the power supply of an instrument in which the amplifier circuit functions, said amplifier circuit comprising:

first and second circuit input terminals and first and second circuit output terminals;

a common line coupled to said second circuit output terminal;

first operational amplifier means having a first input, a second input, an output and a feedback network including a feedback resistor coupled to said second input, said first input being coupled to said first circuit input terminal, said second input being coupled to said second circuit input terminal, and said output being coupled to said first circuit output terminal;

second operational amplifier means having a first input, a second input, an output and a feedback network including a feedback resistor, said last named first input being coupled to the output of said first operational amplifier means, said last named second input being coupled to said common line, and the output of said second operational amplifier means being coupled to said second input



of said first operational amplifier means and to said second circuit output terminal for dissipating the feedback current of said first operational amplifier means;

third operational amplifier means having a first input coupled to the first input of said second operational amplifier means, a second input coupled to said second circuit input terminal, an output, and first and second feedback means coupling said last named output to the second input of said third operational amplifier means for driving the common line to the same potential as applied to said second circuit input terminal and for preventing said third operational amplifier means from saturating.

3,875,524
PHASE-STABLE DECADICALLY ADJUSTABLE FREQUENCY SYNTHESIZER

Peter Harzer, and Gunther Hoffman, both of Eningen, Germany, assignors to Wandel u. Goltermann, Reutlingen, Germany

Filed Aug. 16, 1973, Ser. No. 388,887
Claims priority, application Germany, Aug. 16, 1972, 2240216
Int. Cl. H03b *3/04*
U.S. Cl. 331—1 A **9 Claims**

1. A frequency synthesizer comprising:

oscillator means generating a sequence of spikes of variable repetition frequency F;

a generator of reference frequency $f < F$;

a frequency divider of step-down ratio n:1 having its input connected to receive said sequence of spikes from the output of said oscillator means, said frequency divider including at least one decadic divider stage and a terminal stage;

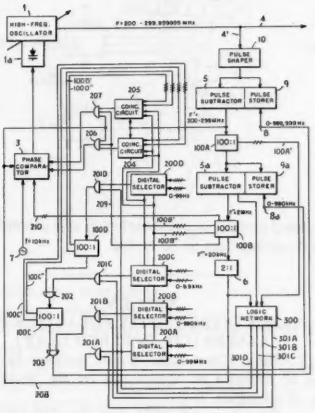
a pulse subtractor inserted between the output of said oscillator means and the input of said decadic divider stage for suppressing an incoming spike in response to a control pulse applied thereto;

digital selection means connected to said decadic divider stage for deriving therefrom a series of control pulses and applying same to said pulse subtractor to produce a mean frequency lower than F/n in the output of said terminal stage;

phase-comparison means connected to receive said mean frequency from said terminal stage and said reference frequency from said generator, said oscillator means being provided with frequency-control means connected

to an output of said phase-comparison means for stabilizing said mean frequency at a value equal to said reference frequency;

compensating circuitry connected to said selection means for delivering to said phase-comparison means a corrective electrical quantity balancing the effect of control pulses with a recurrence rate smaller than f upon the



constancy of said repetition frequency during steady-state operation; and

blocking means with input connections to said terminal stage and with output connections to said selection means for confining the generation of control pulses to one part and the emission of said corrective quantity to another part of a cycle of said reference frequency.

3,875,525

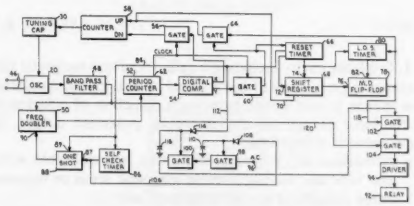
DIGITAL AUTOMATIC OSCILLATOR TUNING CIRCUIT

Forrest H. Ballinger, Grain Valley; Wilfred L. Farnham, Jr., Kansas City, and Robert E. Heggestad, Blue Springs, all of Mo., assignors to Harmon Industries, Inc., Grain Valley, Mo.

Division of Ser. No. 399,969, Sept. 24, 1973, Pat. No. 3,838,270. This application July 5, 1974, Ser. No. 486,195

Int. Cl. R61l *1/06*; H03b *3/04*

U.S. Cl. 331—1 A **5 Claims**



3. Automatically tuned electrical apparatus comprising:

means for producing an oscillatory electrical signal and having variable tuning means capable of controlling the frequency of said signal;

means responsive to said signal for sampling the frequency thereof to sense a deviation in said frequency from a preselected normal frequency, and delivering an output upon the sensing of said deviation;

control means coupled with said deviation sensing means and said tuning means for operating the latter to correct the frequency of said signal and return the same to said normal frequency in response to said output from the sensing means;

frequency responsive means coupled between said signal producing means and said sensing means for interrupting delivery of said signal to said sensing means if the frequency thereof deviates from said normal frequency by a preselected amount to thereby render said sensing means inoperable; and

pulse generating means responsive to interruption of delivery of said signal for exciting said control means with a train of retune pulses to cause the control means to operate said tuning means until the frequency of said signal is returned to within said preselected amount of deviation, whereby to provide automatic retuning in the event that the sensing means is incapable of correcting the signal frequency due to insufficient response to a rapid deviation thereof.

3,875,526

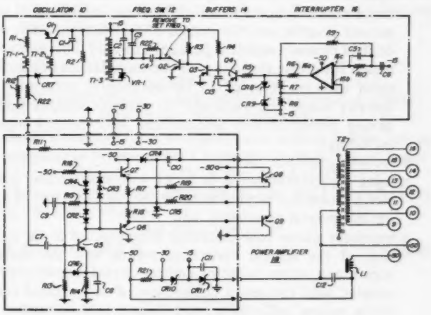
TWO-FREQUENCY ALTERNATE TONE GENERATOR

Robert H. Beeman, Berkeley, and Robert P. Dimmer, Lombard, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Aug. 2, 1973, Ser. No. 385,133

Int. Cl. H03b *5/12*

U.S. Cl. 331—47 **5 Claims**



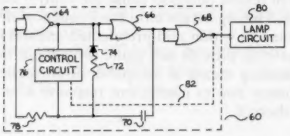
1. A two-frequencey alternating tone generator comprising:

a single frequency oscillator; a source of potential for supplying operating voltage to said single frequency oscillator; said single frequency oscillator including a tuned circuit and capacitance means having one terminal thereof connected to said tuned circuit and the other terminal thereof connectible to said potential source to thereby connect said capacitance means into said tuned circuit; an operational amplifier square-wave generator; switch means comprising a transistor rendered conductive by said operational amplifier square-wave generator to connect said capacitance means to said source of potential and thus into said tuned circuit to change the frequency of said oscillator; said operational amplifier square-wave generator coupled to and operating said switch means to connect said capacitance means to said source of potential at an established periodic rate; a power amplifier for amplifying the output of said oscillator; and resistance means coupled across said capacitance means for discharging said capacitance means during non-conduction of said transistor to thereby permit said oscillator to start instantly on said changed frequency.

3,875,527
ENVIRONMENTAL PARAMETER CONTROLLED OSCILLATOR SYSTEM

Hernando Javier Garcia, 122 Eureka St., San Francisco, Calif. 94114

Filed July 11, 1973, Ser. No. 378,267
Int. Cl. H03k *3/35;* **H05b** *37/02*
U.S. Cl. 331—66 **4 Claims**



1. An environmental parameter responsive oscillator for producing output pulses having either of two frequencies depending upon the condition of an environmental parameter to be sensed comprising

a first inverter;

a second inverter whose input is coupled to the output of said first inverter;

feedback means coupling the output of said second inverter to the input and output of said first inverter, said feedback means including capacitance means and first resistance means coupled in series between the output of said second inverter and the output of said first inverter; and control means coupled in parallel with said first resistance means for presenting either of two impedances depending upon the condition of an environmental parameter to thereby cause the oscillator to produce output pulses having either of two frequencies, said control means including

a second resistance means,

sensing means connected in series with said second resistance means for varying its resistance as a function of said environmental parameter, and

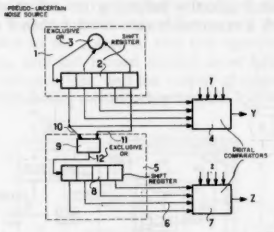
a transistor whose base electrode is connected to the junction of the second resistance means and the sensing means and whose collector-emitter circuit is connected in parallel with the series connection of said second resistance means and said sensing means, said transistor assuming a conducting condition to present a low impedance path when the resistance of the sensing means is in a first range, and said transistor assuming a nonconducting condition so that said second resistance means and sensing means presents a higher impedance path when the resistance of the sensing means is in a second range.

3,875,528
PSEUDO-INDEPENDENT NOISE GENERATOR

Jean-Jacques Hirsch, Echirolles, France, assignor to Societe Generale de Constructions Electriques et Mecaniques (Alsthom), Paris, France

Filed Feb. 12, 1973, Ser. No. 331,472
Claims priority, application France, Feb. 11, 1972, 72.04778
Int. Cl. H03b *29/00*
U.S. Cl. 331—78 **5 Claims**

1. A pseudo-independent noise generator in which an uncertain or pseudo-uncertain original noise is produced by a first shift register connected to a first disjunction operator circuit, the first shift register feeding a first comparator to which data to be coded is also applied, means for generating at least one other pseudo-independent noise comprising a second disjunction operator circuit connected to selected stages of said first shift register, a second shift register having its input connected to said second disjunction operator circuit

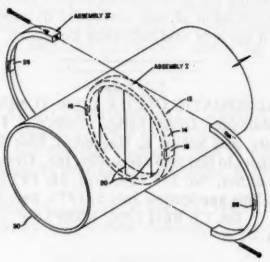


and a second comparator connected to said second shift register and receiving data to be coded.

3,875,529
ROTATABLE INTRA-CAVITY POLARIZER FOR GAS LASERS (CO_2 IN PARTICULAR)

Robert T. Hintz, China Lake, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 14, 1972, Ser. No. 289,199
Int. Cl. H01s *3/08*
U.S. Cl. 331—94.5 C **1 Claim**



1. In a laser cavity including a cylindrical non magnetic tube surrounding a portion of the internal optical axis and polarization means in said cavity inducing a direction of polarization in the laser energy thereby providing polarized output, the improvement comprising:

a cylindrical non magnetic mounting ring rotatable within said tube and having discrete magnetic areas on opposing outer peripheral portions thereof; and

a control ring of non magnetic material dimensionally similar to said mounting ring surrounding said tube and comprising diametrically opposed areas of magnetized material;

said polarization means being mounted in said mounting ring; and

said control ring and said mounting ring being so arranged that said areas of magnetic material are opposite said magnetic areas so rotation of said control ring will cause rotation of said mounting ring by magnetic coupling action to adjust the direction of polarization in the laser energy.

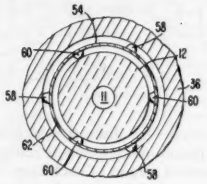
3,875,530
GASEOUS LASER WITH IMPROVED MEANS FOR SUPPORTING THE DISCHARGE CONFINING BORE TUBE

Nubar S. Manoukian, San Jose, Calif., assignor to Coherent Radiation, Palo Alto, Calif.

Continuation-in-part of Ser. Nos. 320,093, Jan. 2, 1973, , and Ser. No. 320,146, Jan. 2, 1973, , and Ser. No. 320,145, Jan. 2, 1973, abandoned. This application Feb. 23, 1973, Ser. No. 335,239

Int. Cl. H01s *3/22*

U.S. Cl. 331—94.5 D **6 Claims**



1. A gaseous laser comprising:
   a. a discharge-confining bore tube;
   b. optical resonator axially aligned with at least a part of said bore tube;
   c. means for providing an electrical discharge through said discharge-confining bore tube including an anode and an elongated cylindrical cathode surrounding at least a part of said bore tube and a cap means for closing an end of said cathode;
   d. said cap means having formed therein a a bore tube receiving aperture, said aperture being larger in size than the outside diameter of said bore tube; and
   e. means for retaining said bore tube within said aperture and spaced apart from said aperture walls, said retaining means including means for allowing axial expansion of said bore tube while maintaining lateral alignment thereof relative to said support member and said optical resonator.

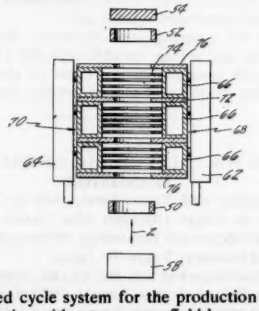
3,875,531
INTEGRATED LASER SYSTEM

Carl J. Buczek, Manchester; Peter P. Chenausky, West Hartford; Robert J. Frieberg, South Windsor, and Robert J. Wayne, East Hartford, all of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Nov. 15, 1973, Ser. No. 416,319

Int. Cl. H01s *3/09*

U.S. Cl. 331—94.5 G **5 Claims**



1. A closed cycle system for the production of stable frequency radiation with a transverse field laser comprising:
   a laser channel for the production of coherent radiation by stimulated emission from an excited gaseous working medium flowing along a longitudinal axis through the channel which has a gas passageway therethrough perpendicular to the longitudinal axis, the passageway having a rectangular cross section and a high aspect ratio, the channel having a plurality of juxtaposed metal modules which are physically separated from one another by thin sheets of dielectric material, each module comprising a hollow top tube and a hollow bottom tube joined by a plurality of metal fins aligned in parallel along the longitudinal axis, and the channel including:
   optical means for coupling the coherent radiation out of the excited working medium as an optical beam which traverses the channel through a series of holes concentric with an optical axis for the beam, the optical axis being perpendicular to the longitudinal axis; and
   electric discharge means comprising annular electrodes which are concentric about the optical axis;
   gas pumping means for overcoming the pressure drop required to flow the working medium from the gas inlet to the gas outlet of the channel and to recirculate the medium from the gas outlet back to the gas inlet;
   a main gas conduit formed of dielectric materials comprising:
   first flow means connecting the channel gas outlet with the low pressure side of the gas blower; and
   second flow means connecting the high pressure side of the gas blower with the channel gas inlet;
   a source of electric power connected to the annular electrodes to produce a discharge plasma along the optical axis by maintaining an electric potential between the electrodes; and
   heat exchange means for the removal of heat absorbed from the working medium in the channel by the modules, the exchange means including a dielectric coolant which is passed through fluid passageways in the top and bottom tubes of each module.

3,875,532
SEMICONDUCTOR LASER DEVICE HAVING A LIGHT FOCUSING TRANSMISSION

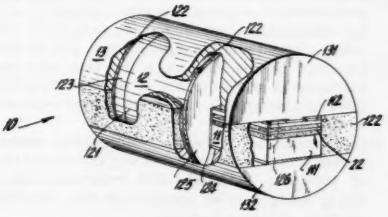
Kohroh Kobayashi, and Atsufumi Ueki, both of Tokyo, Japan, assignors to Nippon Selfoc Company, Limited, Tokyo, Japan

Filed Dec. 26, 1973, Ser. No. 428,054

Claims priority, application Japan, Dec. 29, 1972, 47-1841; Jan. 18, 1973, 48-8337

Int. Cl. G02f *3/00*

U.S. Cl. 331—94.5 H **18 Claims**



1. A laser device for generating a light beam of predetermined cross section along a given path including:
   a semiconductor element having a first and a second opposed end surfaces, said element including a longitudinally extending laser active region extending between said end surfaces, the cross section of said region being elongated in a first direction, and said region having a substantially central axis;
   first reflecting means disposed on said first end surface of said element in the path of said beam;
   a light transmission body having an axis which is collinear with said axis of said laser active region, said transmission body having an inner and an outer opposed surfaces, said inner surface of said body being arranged closer to said laser element than said outer surface of said body;

said light transmission body including a light focusing portion arranged along said axis of said transmission body, said focusing portion having a refractive index which decreases substantially proportionally to the square of the distance from said axis of said body at least in a direction substantially perpendicular to the direction of elongation of said laser region; and

second reflecting means disposed on said outer surface of said body.

3,875,533

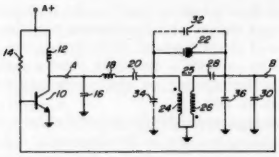
CRYSTAL CONTROLLED OVERTONE OSCILLATOR HAVING A REJECTION CIRCUIT FOR PREVENTING OSCILLATION AT UNDESIRED OVERTONES

James S. Irwin, Ft. Lauderdale, and Francis R. Steel, Pompano Beach, both of Fla., assignors to Motorola, Inc., Chicago, Ill.

Filed Oct. 15, 1973, Ser. No. 406,530

Int. Cl. H03b *5/36*

U.S. Cl. 331—116 R **8 Claims**



1. A crystal controlled overtone oscillator comprising:

an amplifier having first, second and third terminals;

a point of reference potential connected to said third terminal;

a piezoelectric crystal having a predetermined overtone operating frequency and other resonant frequencies;

an inductor and a capacitor conncted in a series circuit with said crystal, said series circuit being connected in series between the first and second terminals of said amplifier, said inductor and capacitor having values chosen such that the inductive reactance of said inductor is greater than the capacitive reactance of said inductor is greater than the capacitive reactance of said capacitor at said predetermined overtone operating frequency, said inductor and capacitor further arranged to form the inductive tuning element of a Colpitts oscillator, and the inductive reactance of said inductor is less than the capacitive reactance of said capacitor at resonant frequencies of said crystal lower than said predetermined overtone operating frequency; and

parallel connected inductance-capacitance means connected betweeen a terminal of said crystal and the point of reference potential, said inductance-capacitance means being parallel resonant at said predetermined overtone operating frequency.

3,875,534

TECHNIQUE TO PCM HIGH POWER LASERS

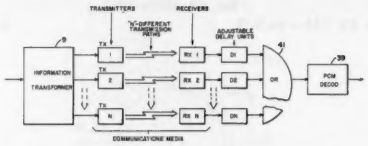
Roger Lindsy Haven, Denville, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 26, 1973, Ser. No. 410,053

Int. Cl. H01s *3/10*

U.S. Cl. 332—7.51 **6 Claims**

1. A system comprising a plurality of optical generating means; a plurality of triggering means individually connected to said plurality of optical generating means to selectively trigger at a discrete optical output therefrom; each of said triggering means having a controlled input; a distributor means having an input and a plurality of outputs; a signal containing digital information being fed to the input of said distributor means; said distributor means sequentially producing a signal at its outputs in accordance with the digital information at its inputs; said plurality of outputs being connected to the inputs of said plurality of triggering means so as to sequentially cause the triggering of said plurality of optical generating means; said plurality of optical generator means are lasers; said signal containing digital information consists of digital signals with a series format; a beam directing means



positioned to receive the discrete optical outputs of said lasers; reflecting means in said beam directing means positioned such that the optical output of each laser will follow a single transmission path out of the beam directing means; an optical detector spacially located from said beam directing means and positioned to receive the optical outputs of said beam directing means; a delta modulator having an input and an output; an analog signal being fed to the input of said delta modulator; and said delta modulator producing the digital signal having the series format.

3,875,535

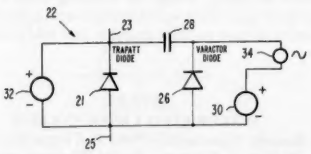
ENHANCED EFFICIENCY DIODE CIRCUIT

Kern Ko Nan Chang, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 24, 1973, Ser. No. 363,668

Int. Cl. H03c *3/22;* **H03b** *7/06*

U.S. Cl. 332—30 V **9 Claims**



1. An enhanced efficiency diode circuit comprising:

a. a microwave diode arranged to operate in a TRAPATT mode in response to a bias signal to form a plasma and generate signals at harmonically related frequencies;

b. a voltage variable capacitor element arranged to generate signals at harmonically related frequencies in response to said diode generated signals; and

c. means for coupling said microwave diode generated signals to said voltage variable capacitor element so that said signals generated by said capacitor element enhance operating efficiency of said microwave diode.

3,875,536

METHOD FOR GAIN CONTROL OF FIELD-EFFECT TRANSISTOR

Yutaka Hayashi, and Yasuo Tarui, both of Tokyo, Japan, assignors to Kogyo Gijutsuin (also known as Agency of Industrial Science and Technology, Ministry of International Trade and Industry), Tokyo-To, Japan

Continuation-in-part of Ser. No. 24,166, March 31, 1970, abandoned. This application June 21, 1972, Ser. No. 264,965

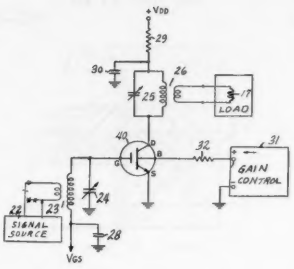
Claims priority, application Japan, Nov. 24, 1969, 44-93595

Int. Cl. H03c *1/36*

U.S. Cl. 332—31 T **8 Claims**

1. A method for gain control and amplitude modulation of a field effect transistor device provided with at least a gate

electrode, a gate insulator, a source, a base and a drain, which device is capable of performing as a bipolar transistor when said source, base and drain are used as an emitter, a base and a collector respectively, comprising the steps of providing a resistor, a resonant circuit and a power source in series with the source-drain circuit, capacitively decoupling the resistor,



coupling a load to said resonant circuit, applying a bias voltage to said gate electrode, applying a first signal to said gate electrode, applying a second signal between said base and source electrodes comprising a forward base-source current, and increasing and decreasing the forward base-source current by altering said second signal to provide gain control and amplitude modulation.

3,875,537

CIRCUITS FOR MODIFYING THE DYNAMIC RANGE OF AN INPUT SIGNAL

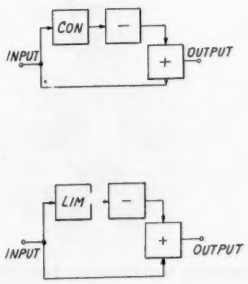
Ray Milton Dolby, London, England, assignor to Dolby Laboratories, Inc., New York, N.Y.

Division of Ser. No. 356,126, May 1, 1973, Pat. No. 3,828,280. This application May 13, 1974, Ser. No. 469,085

Claims priority, application United Kingdom, May 2, 1972, 20406/72

Int. Cl. H03h *7/14*; **H04b** *1/64*

U.S. Cl. 333—28 R **6 Claims**



1. A circuit for modifying the dynamic range of an input signal, comprising first circuit means responsive to the input signal to provide a first signal component which possesses dynamic range linearity relative to the input signal, second circuit means which include a circuit having the characteristics of a limiter and which provide a second signal component which is non-linear relative to the input signal, and means for combining the first and second signal components to provide an output signal whose dynamic range is modified relative to that of the input signal, wherein the circuit having the characteristics of a limiter comprises a first circuit path and a second circuit path which includes a conveyor and is connected in parallel with the first circuit path as one of a negative feedforward and a negative feedback loop relative to the first circuit path.

3,875,538

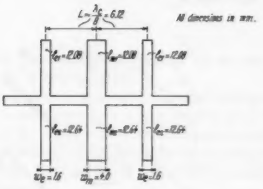
MICROWAVE BANDPASS FILTER

Roger P. Minet, 60 Residence Corlay; Jean H. Debeau, 26 Residence Corlay, both of Lannion 22300, and Ernest L. Thepault, 2 Rue du Docteur Roux, Perros-Guirec 22700, all of France

Filed Feb. 20, 1974, Ser. No. 444,140

Int. Cl. H01p *1/20, 3/08*

U.S. Cl. 333—73 S **6 Claims**



1. A microwave bandpass filter of strip transmission line structure comprising a main rectilinear strip conductor, a plurality of open-ended strip line stubs all having one-half wave length at the mid frequency of the passband of said filter and parallel-connected to the main strip conductor at connecting points, said connecting points being regularly spaced apart along the main strip conductor and being, on each strip line stub, selectively offset with respect to the midpoint of the stub, and their spacing along said main conductor being much smaller than a quarter wavelength along said main conductor at said mid frequency.

3,875,539

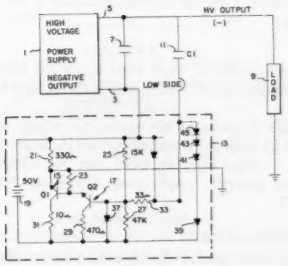
HIGH VOLTAGE RIPPLE REDUCTION CIRCUIT

Charles Nelson Fendrich, Jr., Elizabethtown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 26, 1973, Ser. No. 419,169

Int. Cl. H03h *7/02, 11/00*

U.S. Cl. 333—79 **6 Claims**



1. A ripple reduction circuit for a high voltage power supply having a pair of output terminals and

capacitor means connected across said output terminals, including

a resistive impedance connected between one of said output terminals and a load,

an amplifying circuit including transistor means,
said resistive impedance being connected in series with the collector-emitter path of the transistor means and an independent current source,
and means coupling said capacitor means to the electrodes of the transistor means to control the current through the collector-emitter path and the resistive impedance to reduce the ripple current therethrough.

3,875,540

MICROSTRIP CONDUCTOR WITH VARIABLE CAPACITOR

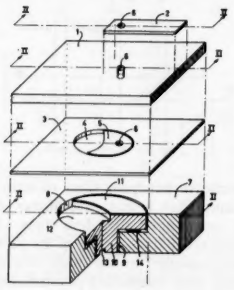
Johannes Hendrik Cornelis Van Heuven, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Phillips Corporation, New York, N.Y.

Filed May 9, 1974, Ser. No. 468,247

Claims priority, application Netherlands, May 25, 1973, 7307295

Int. Cl. H01p *3/00;* **H01g** *5/06*

U.S. Cl. 333—84 M **6 Claims**



1. Variable-capacitance capacitor for use in a circuit of microstrip configuration, comprising a substrate of dielectric material, a plane ground plate of conductive material arranged in contact with one of the broad surfaces of the substrate, and a narrow strip-like conductor provided in contact with the other larger surface of the substrate, wherein the ground plate being made up of at least two parts arranged so as to be insulated from one another, a conductive connection being established between the narrow strip-like conductor and a first part of the ground plate, while a conductive member is arranged so as to be slightly spaced from the said first part of the ground plate and insulated therefrom, the disposition of this member relative to the said first part of the ground plate being adjustable, while the conductive member is coupled for high-frequency energy to a second part of the ground plate.

3,875,541

ARRANGEMENT FOR MOUNTING A MICROWAVE COMPONENT WITH A SOLDERLESS GROUND CONNECTION

Eva-Maria Schioberg, Backnang, Germany, assignor to LICENTIA Patent-Verwaltungs-GmbH, Frankfurt, Germany

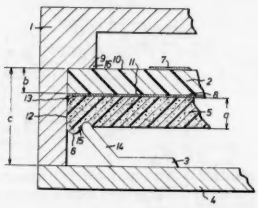
Filed Nov. 30, 1973, Ser. No. 420,464

Claims priority, application Germany, Nov. 30, 1972, 2258557

Int. Cl. H05k *9/00*

U.S. Cl. 333—97 R **4 Claims**

1. In an arrangement for mounting a microwave component including a housing, a substrate on which the microwave component is positioned, the substrate being positioned within the housing, and contact means for providing a solderless ground connection for the microwave component, the improvement wherein: said housing has a step-shaped portion and at least a part of one wall of said housing is conductive; said substrate has two opposed longitudinal surfaces, one of which is positioned against said step-shaped portion; said substrate includes a metallization layer disposed on the other said surface; said contact means includes a conductive member made of an elastically deformable conductive material, said conductive member contacting said metallization layer of said substrate and said conductive part of said housing, and pressure means for pressing said conductive member against said metallization layer so as to provide the ground connection



between said metallization layer and said conductive part of said housing; said substrate has an edge section which abuts against said housing so as to define a corner and said pressure means presses said conductive member substantially into said corner; and said pressure means is a housing-shaped member, said housing-shaped member including an end wall which extends at an oblique angle toward said conductive part of said housing and which has an outer edge pressing against said conductive member.

3,875,542

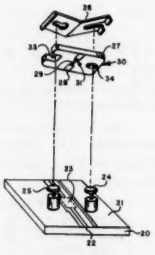
HIGH FREQUENCY FUSE

Kenneth Craig Holland, Portland, and John Alan Roberts, Hillsboro, both of Oreg., assignors to Tektronix Inc., Beaverton, Oreg.

Continuation-in-part of Ser. No. 338,013, March 3, 1973, , which is a continuation-in-part of Ser. No. 114,273, Feb. 10, 1971, Pat. No. 3,753,170. This application Sept. 10, 1973, Ser. No. 395,666

Int. Cl. H01p *1/00;* **H01h** *85/04*

U.S. Cl. 333—97 R **2 Claims**

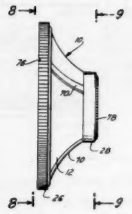


1. A removable high frequency fuse, comprising:
a support member means which has securing means therein and opening means therein;
interrupted transmission line means on opposite sides of said support member means and extending through said opening means substantially intermediate of said securing means; and
a fuseable element that spans said interrupted transmission line means on one side of said support member and is bonded to said interrupted transmission line means, said fuseable element substantially maintaining said transmission line means.

3,875,543
TOROIDAL CORE-COIL COMBINATION WITH IN SITU MOLDED END RINGS

Ernest Gostyn, El Paso, Tex., and Francis J. Fratar, Springfield, Mass., assignors to General Instrument Corporation, Newark, N.J.

Division of Ser. No. 414,978, Nov. 12, 1973,. This application Aug. 29, 1974, Ser. No. 501,687
Int. Cl. H01f 7/00
U.S. Cl. 335—210 **14 Claims**



1. A toroidal core-coil combination,

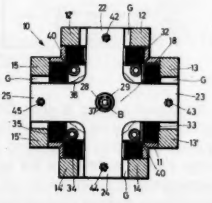
A. said core comprising a toroidal body formed of magnetic material and having a central opening therethrough and ends, and end rings formed of insulating plastic material molded in situ on each of said ends substantially covering the axially exposed surfaces thereof, each said end ring having an exposed surface provided with a series of grooves circumferentially exposed therearound; and

B. said coil comprising a wire conductor wound on said body in turns passing through said central opening, said turns being received in and located by said grooves, the dimensions of said grooves being so related to the dimensions of said conductor as to permit such winding and enable such location of said turns.

3,875,544
TORQUE MOTOR, ESPECIALLY FOR THE RUDDER GEAR OF A FLYING OBJECT

Otto Rossmanith, Ottobrunn, Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Munich, Germany

Filed Dec. 20, 1973, Ser. No. 426,551
Claims priority, application Germany, Dec. 28, 1972, 2263792
Int. Cl. H01f 7/08
U.S. Cl. 335—230 **17 Claims**

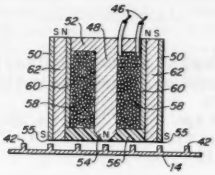


1. A torque motor, especially for the steering gear of a missile, comprising housing means, four electromagnets located in a cross configuration in said housing means, a cross-shaped armature having four free ends, bearing means secured to said housing means and to said cross-shaped armature for pivotally supporting said armature in said housing means substantially symmetrically relative to said electromagnets so that each free armature end cooperates with the respective electromagnet whereby the armature is universally displaceable in response to the size and direction of current flowing through said electromagnets.

3,875,545
VARIABLE RELUCTANCE TRANSDUCER

Robert H. Curtiss, Wayland, Mass., assignor to Nortec Computer Devices Inc., Santa Clara, Calif.

Filed Sept. 12, 1969, Ser. No. 857,506
Int. Cl. H01f 21/00
U.S. Cl. 336—110 **4 Claims**



1. A transducer for sensing the passage of moving spaced indicia comprising, in combination:

A first pole piece of ferromagnetic material having an elongated portion terminating in a pole at one end, having a flat portion at the other end of the elongated portion, and having a cylindrically-shaped portion projecting from the periphery of the flat portion in a direction parallel to the elongated portion;

a coil of electrically-conducting material surrounding at least part of the elongated portion of the first pole piece;

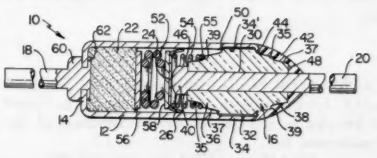
a radially-polarized, cylindrically-shaped sleeve of permanent magnetic material surrounding the cylindrical-shaped portion of the first pole piece;

and a second pole piece of ferromagnetic material having a cylindrical shape, having a length substantially equal to the length of the elongated portion of the first pole piece, surrounding the magnetic sleeve, and terminating in at least one pole at the end nearest the pole of the first pole piece.

3,875,546
ELECTRICAL SWITCH CONSTRUCTION AND END PLUG THEREFOR OR THE LIKE

Phillip Edward Merrill, Kettering, Ohio, assignor to Micro Devices corp., Dayton, Ohio

Continuation-in-part of Ser. No. 163.170, July 16, 1971, Pat. No. 3,778,742. This application Oct. 4, 1973, Ser. No. 403,539. The portion of the term of this patent subsequent to Dec. 11, 1990, has been disclaimed.
Int. Cl. H01h 37/76
U.S. Cl. 337—407 **10 Claims**



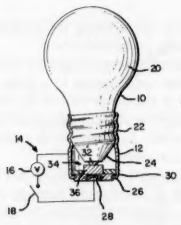
1. In a switch construction having an open ended casing provided with two conductors and means for normally maintaining one electrical relationship between said conductors and for providing another electrical relationship between said conductors upon the occurrence of a certain event, the switch construction having a rigid insulating plug closing the open end of said casing and having a plug opening passing therethrough and through which one of said conductors is received so as to extend outwardly from said casing and inwardly into

said casing, said plug having a large central portion secured to said casing, said plug having two identical inward and outward extensions extending from said central portion so as to be useable in a like manner regardless of which extension is the inward or outward one thereof in its assembled relation with said casing whereby the inward extension provides a locating means for a spring inside said casing and the outward extension provides means for spacing the exposed part of said one conductor from said casing a predetermined distance, the improvement wherein each of said extension of said plug has an axial length at least approximately the same as the axial length of said central portion of said plug.

3,875,547
CURRENT SURGE ELIMINATOR

David Kahn, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 16, 1973, Ser. No. 351,717
Int. Cl. H01c *13/00*; H02h *3/20*
U.S. Cl. 338—219 **11 Claims**



1. A device for eliminating current surge between a source of current and an electrical appliance using said current, said device being adapted to be connected in series between said current source and appliance and comprising, a polyconductive material having the characteristic that its electrical resistance value at temperatures below a predetermined transition temperature is at least several orders of magnitude larger than its resistance value at temperatures above said transition temperature, said transition temperature being above the temperature to which said device is normally subjected whereby said polyconductive resistance element initially passes a relatively low predetermined magnitude of electrical current to said appliance until the temperature of the element is raised to said transition temperature by the Joule effect heating whereupon a higher magnitude of electrical current is passed through said device to operate said appliance; said polyconductive material comprising a mechanical mixture of at least two different polyconductive compositions having different transition temperatures, whereby said resistance element is transformed from its highest resistance state to its lowest resistance state in stages.

3,875,548
CALIBRATOR PLUG-IN-MODULE FOR SONOBUOY

Robert S. Acks, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

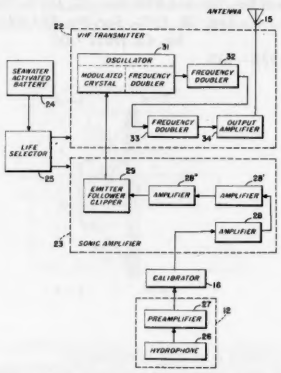
Filed Mar. 1, 1974, Ser. No. 447,458
Int. Cl. H04b *11/00*
U.S. Cl. 340—2 **11 Claims**

1. In a telemetered sonobuoy having a pendant hydrophone-preamplifier, and immersion power source, and a surfaced housed electronics package the improvement of a plug in calibrator module comprising:

signal generating means for generating a predetermined audio signal;

timing circuit means connected to said immersion actuated power source and said signal generating means for determining a fixed, predetermined operational interval for the signal generating means; and

switching means connected between the sonobuoys hydrophone-preamplifier, and said signal generating circuit and

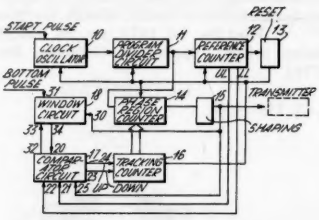


connected to said timing circuit means for timely, alternative connection of the hydrophone-preamplifier or said signal generating means to the sonobuoys electronic package.

3,875,549
TRANSMITTER TRIGGER CIRCUIT FOR ECHO-SOUNDERS OR SIMILAR DEVICES

Erik Stenersen, and Sverre Johannessen, both of Horten, Norway, assignors to Simrad A.S., Horten, Norway

Filed June 27, 1973, Ser. No. 374,103
Claims priority, application Norway, June 27, 1972, 2294/72
Int. Cl. G01s *9/68*
U.S. Cl. 340—3 E **2 Claims**

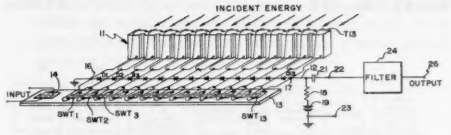


1. A device for adjusting the trigger timing of distance measuring equipment measuring the delay time for reflection of transmitted pulses of energy comprising a transmitter for transmitting energy pulses; a detector for indicating an echo of prescribed characteristics received by said device within a prescribed period of time; a phase comparator for determining an echo of prescribed characteristics received before or after said prescribed period of time; and a variable-delay circuit controlled by said detector and said phase comparator to delay the triggering of said transmitter whereby echoes having prescribed characteristics are received by said device within said prescribed period of time by maintaining said delay of the transmitter triggering constant when said detector indicates echoes within said prescribed period of time, and by increasing or reducing said delay of the transmitter triggering in response to said phase comparator when the echo is received before or after said prescribed period of time, respectively.

3,875,550
ELECTRONICALLY FOCUSED ACOUSTIC IMAGING SYSTEM AND METHOD

Calvin F. Quate, Los Altos Hills; James F. Havlice, Menlo Park, and Gordon S. Kino, Stanford, all of Calif., assignors to Board of Trustees of Leland Stanford Junior University, Stanford, Calif.

Filed July 16, 1973, Ser. No. 379,760
Int. Cl. G01v *1/00;* **H04b** *13/00;* **H04r** *15/00*
U.S. Cl. 340—5 MP **44 Claims**



1. A system for scanning an array of transducer elements of the type which convert impinging energy into corresponding electrical transducer signals, comprising:
- a plurality of mixers, one for each of the transducer elements;
- means coupling each of the transducer elements to its corresponding mixer;
- a delay line having a plurality of taps, one for each of said mixers,
- signal generating means for propagating one of various predetermined delay line signals down said delay line; and means for coupling each delay line tap to a corresponding mixer to produce output signal from those mixers at which a transducer and a delay signal coexist and to produce output signal with frequencies equivalent to the sum and different frequencies between said transducer signals and said delay line signals.

3,875,551
RUNWAY APPROACH RADAR REFLECTORS

David M. Young, 627 N. Beachwood Dr., Burbank, Calif. 91506

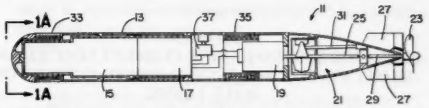
Filed Aug. 2, 1973, Ser. No. 385,087
Int. Cl. H01q *15/14*
U.S. Cl. 343—5 LS **2 Claims**

1. A radar reflector system for guiding an aircraft onto a runway in an airport complex, comprising, in combination:
- a. a radar system operating at a given wavelength generating a fan-shaped beam in a vertical plane which is rapidly scanned in azimuth to provide a perspective image of the airport complex on a display screen, said radar system and display screen being wholly self-contained in said aircraft; and
- b. a passive radar reflector means including a plurality of reflector members uniformly spaced along a path parallel to the length of the runway surface, each reflector member having a given height H, the separation distance between adjacent members in the direction of the length of the runway along said path being a given distance D, and wherein for a desired given glide slope angle, the ratio H/D equals the sine of the glide slope angle and D times the cosine of the glide slope angle is an integral multiple of said given wavelength, whereby a reflected radar signal from the member displayed as a glow on the display screen in the aircraft approaching at said given glide slope angle will move in elevation as seen on the display screen with respect to the airport complex through distances indicated on the display screen corresponding to the actual elevational movements of the aircraft independent of pitch and yaw, the movement of the reflected signal glow in elevation being equivalent to the movement of a reflected image of the aircraft in a large mirror in front of the aircraft normal to the glide slope line of the aircraft.

3,875,552
UNDERWATER MOBILE TARGET

Medford N. Hogman, Edmonds; James F. Shedd, Seattle; Keith S. Yett, Seattle, and Harold A. Kolve, Seattle, all of Wash., assignors to The United States of American as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 23, 1973, Ser. No. 408,976
Int. Cl. G09b *9/00*
U.S. Cl. 340—5 D **10 Claims**

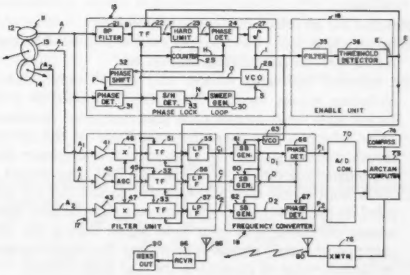


1. A device comprising:
- a. an elongated body having a forward section and a rearward section;
- b. said body including a control system;
- c. said control system including at least one movable control member operatively connected to the exterior of the rearward section of said elongated body;
- d. sensing means for sensing the position of the longitudinal axis of said body with respect to horizontal;
- e. actuator means responsive to said sensing means for actuating said at least one movable control member;
- f. a motor for propelling said body in the forward direction; and
- g. control means for periodically turning said motor on and off.

3,875,553
DIRECTIONAL DETECTION SYSTEM

Vincent A. Formica, Holland; Steve F. Torok, Southampton, and Jasper Caro, Levittown, all of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 27, 1971, Ser. No. 212,809
Int. Cl. G01s *3/80*
U.S. Cl. 340—16 R **10 Claims**



1. A system for determining the direction to an acoustic signal source comprising, in combination:
- first means for receiving the acoustic signal and for producing omnidirectional and directional output signals respec-

tively indicative of the total amplitude and the amplitudes along two orthogonal vectors;

second means connected to receive one of said first means output signals for locking on a frequency above a predetermined signal-to-noise ratio and for producing an output error signal indicative of the deviations from said frequency;

third means connected to receive said deviation signal for detecting when it is within a preselected frequency range and above a predetermined amplitude and for producing an output enable signal indicative thereof;

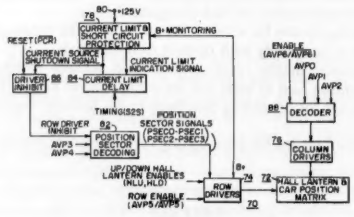
fourth means connected to receive said first, second and third means output signals for producing omnidirectional and directional output signals indicative of said frequency; and

fifth means connected to receive said fourth means output signals for producing an output signal indicative of the arc tangent of the ratio of the directional signals respectively referenced against the omnidirectional signal.

3,875,554
ELEVATOR SYSTEM HAVING CURRENT LIMITED AND SHORT CIRCUIT PROTECTED POWER SUPPLY FOR HALL LAMPS

Clyde A. Booker, Jr., and Alan F. Mandel, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 8, 1973, Ser. No. 358,430
Int. Cl. B66b *3/02*
U.S. Cl. 340—21 **4 Claims**



1. An elevator system, comprising: a building having a plurality of floors, an elevator car mounted for movement in said building to

serve the floors, hall lamp means disposed at the least certain of the floors

of the building served by the elevator car, power supply means, driver means responsive to predetermined actions of said

elevator car to selectively connect said hall

lamp means to said power supply means, said power supply means providing electrical current for

the selected hall lamp means, said power supply means including means limiting the current supplied to a selected hall lamp means to a predetermined maximum value which is less than the magnitude of the normal inrush current of said hall lamp means, and greater than the normal operating current of said hall lamp means,

current limit signal means responsive to the current supplied by the power supply means, said current limit signal means providing a current limit signal during the time said power supply means is providing the predetermined maximum value of current to the hall lamp means,

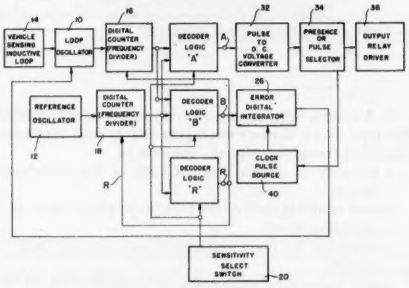
and protective means responsive to said current limit signal, said protective means providing a shutdown signal when the current limit signal persists for a period of time which exceeds the time required for the normal inrush current to said hall lamp means to settle to the normal operating current,

said power supply means including means responsive to said shutdown signal which causes said power supply means to discontinue providing current to said hall lamp means.

3,875,555
VEHICLE DETECTION SYSTEM

Thomas R. Potter, Los Alamitos, Calif., assignor to Indicator Controls Corp., Gardena, Calif.

Filed May 29, 1973, Ser. No. 364,492
Int. Cl. G08g *1/01*
U.S. Cl. 340—38 L **8 Claims**

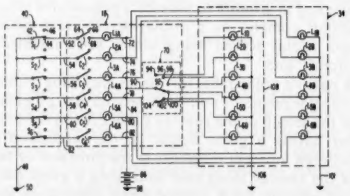


1. An inductive type of vehicle detection system including: an inductive loop to be placed in position to sense the presence of a metallic vehicle; first pulse generating means including a first oscillator circuit connected to the loop and utilizing the loop as a frequency determining element; second pulse generating means including a second oscillator circuit; logic circuit means connected to said first and second pulse generating means for developing output pulses when the frequency differential between said oscillator circuits exceeds a predetermined threshold; and output circuit means connected to said logic circuit means for developing a control signal in response to said output pulses, in which said first and second pulse-generating means includes first and second digital counters respectively connected to the outputs of said first and second oscillator circuits for providing a predetermined frequency division to the outputs therefrom.

3,875,556
POSITIVE SEAT BELT INDICATOR SYSTEM

Jesse B. Beaird, 2769 N.W. 17th St., Oklahoma City, Okla. 73107

Filed Jan. 9, 1974, Ser. No. 432,114
Int. Cl. B60r *21/00*
U.S. Cl. 340—52 E **16 Claims**



1. In a display system for visually displaying externally of an automotive vehicle the state of the vehicle seat belts at seat positions corresponding to the vehicle occupants, including; a two section seat belt at each vehicle occupant seat position and first switch means operatively associated with said seat

belt sections and responsive to seat belt coupling, and a non-occupant viewable electrical indicator provided on the vehicle exterior for indicating coupling or uncoupling at each occupant seat position, the improvement comprising:

second switch means operable by the vehicle driver for each occupied seat position, and

third switch means operable by said driver and movable to a position representing the total number of occupants within the vehicle, and

wherein said external indicator includes indicator means responsive to operation of said first, second and third switch means to indicate the total number of occupants within the vehicle and the failure of a given occupant to couple his seat belt sections and the seat position of said given occupant.

3,875,557

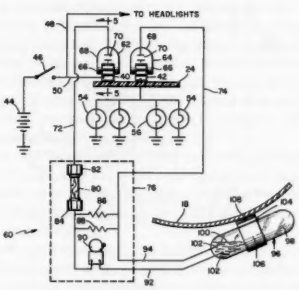
HEADLIGHT WARNING SYSTEM FOR VEHICLES

Edward L. Lawson, 538 N. Fifth St., Bayport, Minn. 55003

Filed Apr. 1, 1974, Ser. No. 456,964

Int. Cl. B60q *5/00*

U.S. Cl. 340—52 D **13 Claims**



1. A headlight warning system for plugging into the tail lamp circuit of a vehicle, comprising first and second contact members engageable with the tail lamp fuse clips in lieu of the usual tail lamp fuse, a resistor, means connecting said resistor in series with said contact members, a normally open switch, an electrically operated alarm, and means connecting said normally open switch and alarm in series with each other and in parallel with said resistor.

3,875,558

METHOD OF MAKING A HEAT DETECTING TIRE, A HEAT DETECTING TIRE, AND OPERATIVE TIRE HEAT DETECTING SYSTEM

Charles R. Samples, 774 Wild Cherry Dr., Akron, Ohio 44319

Filed May 31, 1974, Ser. No. 474,910

Int. Cl. B60c *23/00*

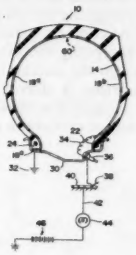
U.S. Cl. 340—58 **12 Claims**

1. A method of making a heat detecting tire comprising the steps of

applying a removable band forming member to a tire to extend around the tire periphery at about the center of the inner surface thereof,

applying a liquid coating of a heat sensitive electrically conductive plastic material adapted to melt in the range of from about 250° F. to about 300° F. over the entire inner surface of the tire, and the member thereon, the coating setting to form a conductive film on the tire surface, and

removing the band forming member to leave two separate laterally spaced annular bands of the plastic material on the tire for use in forming a conductive circuit in the tire



when in operative condition and subjected to excessive heat build up in the tire.

3,875,559

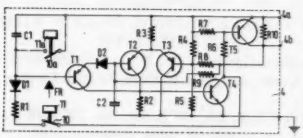
CIRCUIT SYSTEM FOR BRAKE LIGHTS

Istvan Szekessy, Munich, Germany, assignor to Rexroth und Szekessy Entwicklung GmbH, Munich, Germany

Continuation-in-part of Ser. No. 190,071, Oct. 18, 1971, Pat. No. 3,740,715. This application Mar. 21, 1973, Ser. No. 343,259

Int. Cl. B60q *1/26*

U.S. Cl. 340—71 **14 Claims**



1. In a motor-vehicle brake-light circuit system, a brake-switch operated voltage-source connection, at least two brake lights of different colors, a first brake-light output connection of said switch-operated voltage connection to a first-colored one of said lights, and a second brake-light output connection of said switch-operated voltage connection to a second-colored one of said lights; said second output connection being connected to control means including delay-determining means responsive to brake-switch actuation to determine a delayed interval of time following such an actuation, and said control means including signal-generator means producing one characteristic output signal for the duration of said delayed interval and a second characteristic output signal after completion of said interval.

3,875,560

MONITORING SYSTEM

Don W. Williams, Elida, Ohio, assignor to Floren Klopfenstein, Fort Wayne, Ind.

Filed May 10, 1973, Ser. No. 359,205

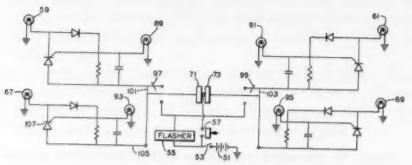
Int. Cl. B60q *1/26*

U.S. Cl. 340—80 **4 Claims**

1. In a vehicle lighting system where exterior lights out of an operator's view are selectively energizable by the vehicle operator from within the vehicle, a circuit for providing the operator with a visible confi.mation that certain selected lights have in fact been energized comprising:

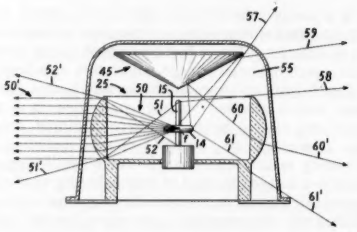
a source of electrical energy within the vehicle;

an exterior lamp;
an interior monitor lamp;
means coupling the exterior lamp to the energy source including operator actuable switch means for selectively energizing and de-energizing the exterior lamp; and
means responsive to the contemporaneous actuation of the switch means for energizing the exterior lamp and the flow of current through the exterior lamp to energize the monitor lamp comprising a silicon controlled rectifier having its cathode connected to the exterior lamp and its anode coupled by way of said switch means to the source



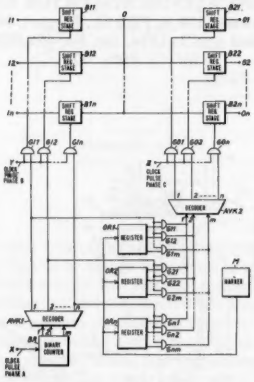
of electrical energy, impedance means coupling the gate and the anode of the said silicon controlled rectifier, the interior monitor lamp being connected to the point between said impedance means and the gate of the silicon controlled rectifier, and a diode coupling the cathode of said silicon controlled rectifier to the point between the impedance means and the gate of the silicon controlled rectifier, whereby anode to cathode conduction of the silicon controlled rectifier energizes the interior monitor lamp with the anode to cathode conduction occuring only when the exterior lamp is energized.

3,875,561
FLASHING VEHICLE WARNING BEACON WITH LENS AND REFLECTOR
John J. Scarpino, Garden City, N.Y., and Daniel B. Ventre, Stamford, Conn., assignors to Hope-Tronics Limited, Hempstead, N.Y.
Filed Sept. 20, 1972, Ser. No. 290,448
Int. Cl. B60q *1/38*
U.S. Cl. 340—81 R **9 Claims**



1. A surface vehicle-mounted emergency beacon including a lower support and mounting portion, a substantially cup-shaped, light-passing casing dome, a light source, electrical means for applying pulsed energization to the light source for flashing thereof, lens means within the dome supported by the support and mounting portion and encircling the light source for collecting light from the source into an intensified band generally horizontally emanating, an upper reflector above the light source and spaced from both the lens and the light source within the dome and generally concentric with the lens, the lens and reflector defining a generally annular opening therebetween, said reflector being configured to provide an upward and outward light path through said opening both directly and by reflection, thereby to illuminate the beacon's environs and to provide warning out of the line-of-sight to the beacon, the reflector further having a surface configuration defining means for diverting rays through both the lens and the opening, substantially reducing directly upward and wasteful skyward rays.

3,875,562
ELECTRONIC SELECTOR HAVING A NUMBER OF INLET AND AN EQUAL NUMBER OF OUTLETS FOR EXCHANGE OF ANALOG OR DIGITAL SIGNALS
Goran Anders Henrik Hemdal, Skarholmen, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden
Filed May 11, 1973, Ser. No. 359,311
Claims priority, application Sweden, May 30, 1972, 7056/72
Int. Cl. H04q *3/00*
U.S. Cl. 340—166 **6 Claims**

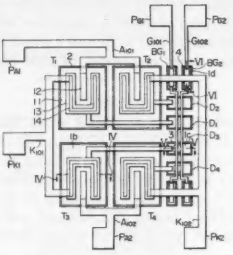


1. An electronic selector for transferring information represented by a given parameter of information pulse signal from one of a plurality of inputs to one of a plurality of outputs comprising: a first plurality of stages, each of said stages temporarily storing a pulse signal and shift register having an information signal input, an information signal output and a shift pulse input; means for connecting the information signal input of each of said shift register stages to one of the inputs of the selector, respectively; a common channel; means for connecting the information signal output of all of said shift register stages to said common first control channel; means for transmitting first shift pulses having a first phase to the shift pulse input of each of the first plurality of shift register stages in sequence whereby each said stage accepts and stores the information pulse signal then present at its information signal input; a second plurality of shift register stages for temporarily storing a pulse signal, each having an information signal input, an information signal output and a shift pulse input; means for connecting each of the information signal inputs of said shift register stages of said second plurality to said common channel; means for connecting the information signal output of each of said shift register stages of said second plurality to one of the outputs of the selector, respectively; a second control means, operating in synchronism with said first means, for transmitting second shift pulses having a second phase delayed from said first phase to each of the shift register stages of said second plurality in a given sequence whereby the shift register stage receiving a second shift pulse accepts and stores the pulse signal for the shift register stage of said first plurality which received the first shift pulse immediately preceding said second shift pulse.

3,875,563
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE SERVING AS SWITCH MATRIX CIRCUIT

Yoshikazu Hosokawa, and Tatsuya Kamei, both of Hitachi, Japan, assignors to Hitachi Ltd., Tokyo, Japan

Filed Feb. 5, 1974, Ser. No. 439,701
Claims priority, application Japan, Feb. 7, 1973, 48-14634
Int. Cl. H04q *3/00*
U.S. Cl. 340—166 R **4 Claims**



1. A semiconductor integrated circuit device serving as a switch matrix circuit having $2m$ (m being an integer number) X-axis input lines and $2n$ (n being an integer number) Y-axis output lines with a semiconductor switch between every X-axis input line and Y-axis output line for electrically connecting selected X-axis input lines and Y-axis output lines through the selective control of said semiconductor switches, said circuit comprising:

at least one fundamental unit consisting of four semiconductor switches each formed in each of the four blocks defined in a semiconductor substrate by crosswise division of rectangular sections of the substrate and insulated from one another;

a pair of input common conductors each connecting two of said four input lines of said four semiconductor switches and a pair of output common conductors each connecting two of said four output lines of said four semiconductor switches; and

cross-over wiring arrangements participated by a pair of control common conductors each connecting two of the control terminals of said four semiconductor switches and by one of said input or output common conductors, the choice of said one common conductor participating the cross-over wiring depending on which is at the lowest potential with respect to said control common conductors among the input and output common conductors.

3,875,564
PROGRAMMED DIGITAL SEQUENCE CONTROLLER

Hisashi Thuruoka, Ome, and Takashi Kogawa, Narashino, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 20, 1973, Ser. No. 343,035
Claims priority, application Japan, Mar. 21, 1972, 47-27382
Int. Cl. G06f *15/46;* **G05b** *15/00*
U.S. Cl. 340—172.5 **9 Claims**

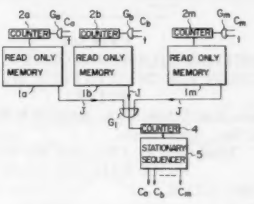
1. Programmed digital sequence controller comprising:

a plurality of read only memories, each of said memories storing a plurality of programs, each of the programs including a plurality of different instruction commands which are selectively utilized to control an object;

a plurality of first program counters, each of said first program counters being connected to a respective read only memory for indicating the address of at least one instruction command of a predetermined program stored within said read only memory so as to read out the at least one instruction command indicated;

a plurality of input means, each of said input means being connected to a respective first program counter for setting the address of the at least one instruction command of the predetermined program to be selected into said program counter;

output means connected to said read only memories for producing at least one output signal in response to the completion of reading out of at least a predetermined



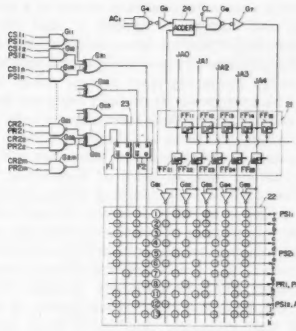
instruction command indicated by said first program counter; and

a stationary sequencer responsive to the output signal from said output means for producing signals for application to said input means and for selecting said read only memory to be addressed one after another.

3,875,565
PROGRAM ADDRESS CONTROL SYSTEM WITH ADDRESS ADVANCE ADDER FOR READ ONLY MEMORY

Hirohide Endou, Kodaira; Yoshiaki Kitazume, Sayama; Jun Kawasaki, Hachioji, and Yoshikazu Hatsukano, Kodaira, all of Japan, assignors to Hitachi Ltd., Tokyo, Japan

Filed Dec. 26, 1973, Ser. No. 427,529
Claims priority, application Japan, Dec. 25, 1972, 47-129259
Int. Cl. G06f *9/16*
U.S. Cl. 340—172.5 **4 Claims**



1. A program addressing control system comprising:

a read only memory having a coordinate array of input and output lines and means interconnecting selected cross-points of said input and output lines, so that respective combinations of signals applied to said input lines will produce a signal on each output line, respective commands being executed in response to the signals from said output lines;

a plural stage address register, the outputs of respective stages of said address register being connected to respective input lines of said read only memory;

an adder having an input connected to the output of said address register for receiving an address signal stored therein and adding "1" to said address signal, and having an output connected to the input of said address register for setting the thus added result therein;

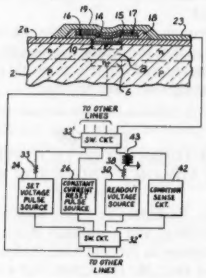
a plurality of condition flip-flops having outputs connected to additional input lines of said read only memory; and

gating means, connected to said condition flip-flops, for controlling the state thereof in accordance with the output signals on the respective output lines of said read only memory and the signal indicating the result of executing the command designated by the output signals.

3,875,566
RESETTING FILAMENT-FORMING MEMORY SEMICONDUCTOR DEVICES WITH MULTIPLE RESET PULSES

Jan Helbers, Ann Arbor, Mich., assignor to Energy Conversion Devices, Inc., Troy, Mich.

Filed Oct. 29, 1973, Ser. No. 410,412
Int. Cl. G11c *7/00, 11/34*
U.S. Cl. 340—173 R **13 Claims**



2. In combination, a filament type memory device including spaced electrodes between which extend a body of generally amorphous non-conductive memory semiconductor material which, when a set voltage pulse in excess of a threshold voltage value and duration is applied to said electrodes, has formed therein a crystalline low resistance filament resettable into a generally amorphous condition by application of reset voltage pulses producing reset current pulses through said filament which progressively partially dissipates the crystalline filament causing said partially reset filament to have a progressively increasing resistance and threshold voltage value reaching a maximum threshold voltage value when substantially the entire crystalline filament involved is returned to its initial amorphous condition; and resetting means for resetting said memory device comprising a source of reset voltage pulses selectively connectable to said electrodes of said memory device for applying thereto for each reset operation a number of said reset voltage pulses respectively producing said reset current pulses which progressively dissipate the crystalline filament, the maximum value of said source of reset voltage pulses at least ultimately reaching a given predetermined value below the maximum threshold voltage value of the memory device, wherein the threshold voltage value of the memory device is automatically stabilized at said maximum voltage output of said source of reset voltage pulses.

3,875,567
MEMORY CIRCUIT USING VARIABLE THRESHOLD LEVEL FIELD-EFFECT DEVICE

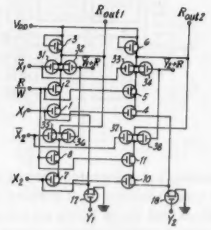
Hiroshi Yamazaki, Isehara, and Tadanori Yamaguchi, Atsugi, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 29, 1972, Ser. No. 319,774
Claims priority, application Japan, Dec. 29, 1971, 47-133572
Int. Cl. G11c *11/40, 7/00*
U.S. Cl. 340—173 R **8 Claims**

1. A memory circuit comprising:

A. a field-effect memory transistor having a gate input electrode and source and drain output electrodes, said memory transistor having a first threshold when subjected to a gate signal voltage less than a first value and having a second threshold when subjected to a gate signal voltage greater than a second value which is higher than said first value;

B. first and second field-effect addressing transistors, each having a gate electrode, a source electrode, and a drain electrode, said source and drain electrodes of said memory transistor and said source and drain electrodes of said first and second addressing transistors being connected in series with each other to permit current flow through said source and drain electrodes of said memory transistor



only when both said addressing transistors are conductive;

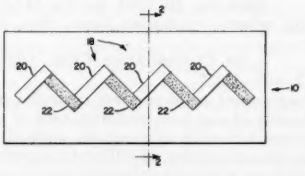
C. means for applying addressing signals to the gate electrodes of said addressing transistors so as to render the latter conductive; and

D. means for applying a gate signal voltage to the gate of said memory transistor when said addressing transistors are conductive, said gate signal voltage being selectively less than said first value to cause said memory transistor to have said first threshold corresponding to a first binary number, greater than said second value to cause said memory transistor to have said second threshold corresponding to a second binary number, and greater than said first value and less than said second value to read the threshold of said memory transistor non-destructively.

3,875,568
MAGNETIC BUBBLE CIRCUIT WITH HARD-SOFT OVERLAY

Paul Townsend Bailey, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed May 7, 1974, Ser. No. 467,736
Int. Cl. G11c *11/14, 19/00*
U.S. Cl. 340—174 TF **16 Claims**



1. A magnetic bubble propagation system, comprising a sheet of magnetic bubble material, means for producing and maintaining bubbles therein, a ferromagnetic overlay circuit operatively disposed on said sheet for moving said bubbles including a repetitive pattern of elongated elements of different coercivity, elements of higher coercivity having poles

which attract bubbles at respective ends of said elements corresponding to the direction of propagation, and means for generating an intermittent pulsed drive field in the plane of said sheet having sufficient amplitude parallel to elements of lower coercivity to form stronger poles than those retained by said elements of higher coercivity and of insufficient amplitude parallel to said elements of higher coercivity to switch the polarity thereof, said circuit being responsive to said intermittent drive field such that during application of said drive field bubbles are drawn to attracting pole positions at corresponding one ends of corresponding elements of lower coercivity and in each pause between application of said drive field bubbles are drawn to the attracting poles retained by said elements of higher coercivity.

3,875,569

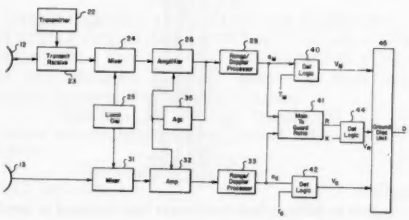
TARGET DETECTION SYSTEM IN A RADAR SYSTEM EMPLOYING MAIN AND GUARD CHANNEL ANTENNAS

Richard M. Hill, Camarillo; David A. Kramer, Canoga Park, and Roy H. Makino, Woodland Hills, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 370,587, June 15, 1973, abandoned. This application May 8, 1974, Ser. No. 467,966

Int. Cl. G01s *9/02*

U.S. Cl. 343—5 R **16 Claims**



1. In a radar system of the type including first and second antennas for receiving radar returns from targets including an airborne target to be detected and main and guard channels for providing respectively a main channel output in response to the radar returns received by said first antenna and a guard channel output in response to the radar returns received by said second antenna, an arrangement comprising:

first means responsive to the main channel output and the guard channel output for providing a selected output only when effectively the ratio of the main channel output to the guard channel output exceeds a selected ratio threshold level; and

second means responsive to said first means and to the outputs of said main and guard channels for providing a target indication signal either when said main channel output exceeds a selected main channel threshold level and the guard channel output is less than a selected guard channel threshold level or when the output of said main and guard channels respectively exceed said main and guard channel threshold levels and said first means provides said selected output.

3,875,570

ADAPTIVE PROXIMITY INDICATING SYSTEM

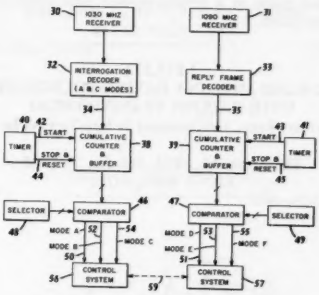
George B. Litchford, Northport, N.Y., assignor to Litchstreet Co., Northport, N.Y.

Filed Mar. 27, 1973, Ser. No. 345,432

Int. Cl. G01s *9/56*

U.S. Cl. 343—6.5 LC **46 Claims**

1. An adaptive proximity indicating system, utilizing interrogations transmitted by standard azimuthally scanning secondary surveillance radar (SSR) stations and received by a first receiver means, and utilizing reply messages transmitted by transponders replying to such interrogations and received by a second receiver means, for monitoring the proximity of transponders in a particular region of space, said indicating system having a plurality of operating modes for adapting to the signal environment and comprising, in combination:



a. interrogation rate measuring means responsive to said first receiver means for measuring the number of interrogations received per unit of time; and

b. means, responsive to said rate measuring means, for modifying the mode of operation of said indicating system in accordance with the interrogation rate.

3,875,571

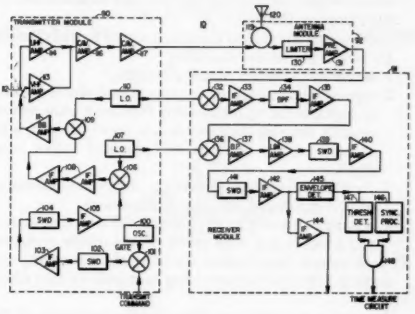
LONG RANGE MARINE NAVIGATION SYSTEM

Paul D. Davis, Jr., Garland; Jerry D. Holmes, Dallas, and Samuel D. Moore, Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 20, 1973, Ser. No. 389,903

Int. Cl. G01s *9/233, 9/56*

U.S. Cl. 343—6.5 R **15 Claims**



1. In navigation wherein base stations at trans-horizon locations relative to a mobile station are to respond to transmissions from said mobile station, the combination which comprises:

a. a generator at said mobile station of a fractional microsecond high frequency pulse,

b. a first surface wave means connected to said generator to extend the duration of said pulse by at least an order of magnitude while frequency modulating said pulse,

c. a transmitter connected to said surface wave means including a carrier signal source the output of which is modulated by the output of said surface wave means,

d. a receiver at said mobile station having a demodulator excited by said carrier signal source for demodulating said carrier,

e. a second surface wave filter means matched to said first surface wave means to produce an output pulse of fractional microsecond duration at a significant amplitude level following demodulation of said carrier, and

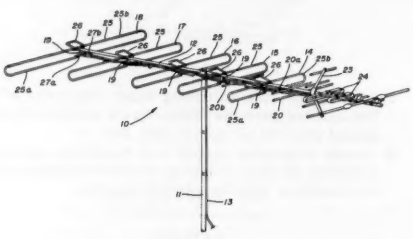
f. processor means connected to said second surface wave filter means responsive to said output pulse to produce a control pulse at a predetermined time relative to said output pulse.

3,875,572

BROAD-BAND ANTENNA HAVING FOLDED DIPOLES WITH HAIRPIN TRANSFORMERS

James C. Kay, Rome, Ga., assignor to Kay-Townes Inc., Rome, Ga.

Filed Apr. 23, 1973, Ser. No. 353,435
Int. Cl. H01q *21/12*
U.S. Cl. 343—803 **2 Claims**



1. A broad-band antenna adapted to be received upon the usual mast and comprising;

A. a boom;

B. a series of antenna elements of progressively increasing length mounted on said boom in right angle relationship therewith, with the shortest of said elements being mounted at the forward end of said boom and with the widest of said elements being mounted adjacent the rearward portion thereof;

C. feed means adapted to transmit a signal to said elements;

D. each said element including

1. a pair of U-shaped dipole elements,

2. support means adapted to support said dipole elements in coplanar facing relationship therewith while simultaneously securing the same to said boom whereby a pair of open center portions are provided between said dipoles,

3. feed means connected between the opposed terminals of said dipoles on one side thereof, and

4. a hairpin transformer component of different material and lesser length than either of said dipole elements;

E. said hairpin transformer spanning the remaining open surface between the remaining terminals of said dipoles and

1. serving as a low-pass filter for the reception of low-band frequency signals, and

2. serving as a capacitor for the reception of high-band frequency signals.

3,875,573

ANTENNA TOWER

Clarence W. Bueckert, Minnesota Lake, Minn. 56068

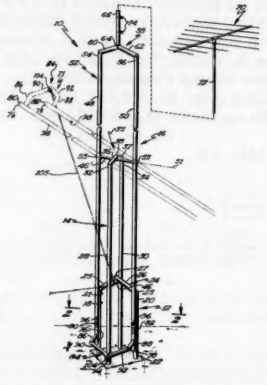
Filed Jan. 2, 1974, Ser. No. 430,381
Int. Cl. H01q *3/02*
U.S. Cl. 343—882 **8 Claims**

1. An antenna tower mounted on the ground for supporting an antenna comprising:

a generally upright, stationary anchoring unit including a first pair of upright rigid posts spaced apart and having lower ends rigidly retained on the ground, the longitudinal axes of said first pair of posts defining a first generally vertical plane when said unit is mounted on the ground;

a generally upright, stationary mast including a second pair of upright rigid posts spaced apart from each other and extending upwardly substantially farther than said anchoring unit, the upper ends of said second pair of posts connected to one another and the lower ends rigidly retained on the ground, the longitudinal axes of said second pair of posts defining a second generally vertical plane when said stationary mast is mounted on the ground, said second plane oriented transversely to said plane;

a rigid brace interconnecting said second pair of posts and fixed to said anchoring unit so that said anchoring unit and said second pair of posts structurally reinforce each other to define a four-post tower base resistant to bending of said first and second pairs of posts;



an elongate, movable mast extending from the level of said anchoring unit substantially above said stationary mast, said movable mast being pivotally connected to said stationary mast adjacent the upper end of said stationary mast to swing about a generally horizontal axis between a generally vertical operating position and an inclined maintenance position, wherein the upper end of said movable mast is lowered adjacent ground level to permit maintenance at the upper end of said movable mast;

means releasably retaining said movable mast to said anchoring unit in said vertical operating position; and

an antenna mount attached to the upper end of said movable mast to receive and retain the antenna.

3,875,574

METHOD FOR IMPROVING PERFORMANCE OF AN INK JET BAR CODE PRINTER

Joseph J. Stone, Northbrook, Ill., assignor to A. B. Dick Company, Chicago, Ill.

Filed Jan. 14, 1974, Ser. No. 432,870
Int. Cl. G01d *18/00*
U.S. Cl. 346—1 **5 Claims**

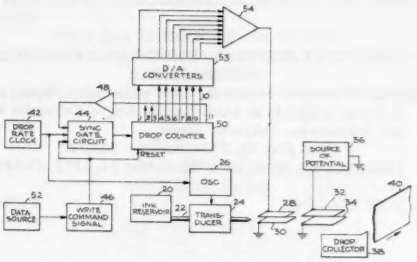
1. In an ink drop printer of the type wherein a stream of drops is emitted for printing a bar in a bar code, and wherein the leading drops in the stream are retarded, due to aerodynamic effects to thereby adversely affect the printing, the method of compensating for the adverse aerodynamic effects comprising

generating a plurality of ink drops to form a stream,

projecting said stream of ink drops in a path toward a receiving substrate for printing a bar thereon,

removing from each stream of drops those drops immediately following the first of the drops in each stream which due to aerodynamic effects cannot align themselves with

the remaining drops in said stream for printing a bar in a bar code, and



deflecting the remainder of the drops in said stream of drops to desired locations on said substrate.

3,875,575
CHART CARRIER AND CHART FOR RECORDING MULTIPLE OPERATIONS AND PARTICULARLY FOR RECORDING A PAIR OF INTERRELATED OPERATIONS

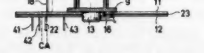
Karl Sinz, Ditzingen, Germany, assignor to Moto Meter GmbH, Leonberg Wurttemberg, Germany

Filed Mar. 28, 1974, Ser. No. 455,903

Claims priority, application Germany, Mar. 30, 1973, 2315974

Int. Cl. G07c *5/12*; **G01d** *15/34*

U.S. Cl. 346—44 **6 Claims**



1. Apparatus for recording multiple operations comprising: a single carrier for holding and moving record charts; at least one pair of such charts, held on said carrier; and at least one pair of record producers, one facing the other and each having means for recording on one of said charts, concurrently with but in mirror-reversed condition relative to the other record producer; each chart of said pair having at least one pair of scales with mirror-reversed scale graduations thereon.

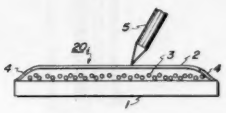
3,875,576
ELECTROSTATIC IMAGING SYSTEM WITH MAGNETIC TONER

Werner E. L. Haas, Webster, and James E. Adams, Ontario, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed June 25, 1973, Ser. No. 373,234

Int. Cl. G03g *15/08*

U.S. Cl. 346—74 ES **15 Claims**



1. A process for electrostatic imaging comprising the steps of:

a. providing an imaging member comprised of a substrate layer, a surface layer with a resistivity above about 10^{10} ohm-cm and toner sandwiched between said substrate layer and said surface layer;

b. producing an electrostatic image on said imaging member by moving a mechanical stylus in contact with the surface layer in an imagewise pattern; and,

c. contacting said toner to said electrostatic image.

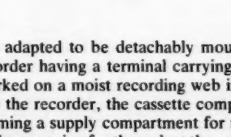
3,875,577
CASSETTE WITH INTEGRAL ELECTRODE FOR MARKING ELECTRIC RECORDING PAPER CONTAINED THEREIN

John M. Alden, Needham, Mass., assignor to Alden Research Foundation, Westboro, Mass.

Filed Sept. 10, 1973, Ser. No. 391,851

Int. Cl. G01d *15/06*

U.S. Cl. 340—74 E **10 Claims**

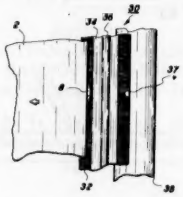


1. A cassette adapted to be detachably mounted in a recorder, the recorder having a terminal carrying an electrical signal to be marked on a moist recording web in a recording zone defined by the recorder, the cassette comprising:

a housing forming a supply compartment for moist recording web and an opening for the web at the recording zone, and

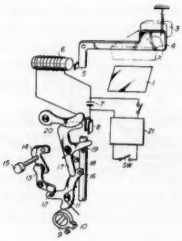
an electrically conductive linear electrode attached to the housing at the opening, the electrode being formed with a recording edge parallel to the opening and with a terminal portion mechanically and electrically connected to the recording edge and shaped to detachably engage the signal terminal member on the recorder and positively to position the electrode with respect to the terminal member and recording zone and maintain electrical contact between the linear electrode and terminal member.

3,875,578
ENVELOPED STYLUS RECORDER
Morton Silverberg, Rochester, N.Y., assignor to Xerox Corporation, Rochester, N.Y.
Filed Mar. 10, 1969, Ser. No. 805,768
Int. Cl. G01d 15/06
U.S. Cl. 346—74 ES 2 Claims



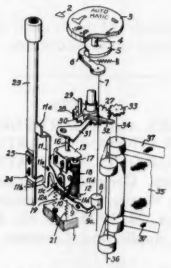
1. An electrographic recording apparatus comprising:
a. a recording head including a stylus electrode adapted to deposit electrostatic charges on a recording medium;
b. motive means for moving said recording head during a recording cycle;
c. signal means for applying recording signals to said recording head during said cycle;
d. a fibrous applicator bearing electroscopic marking particles; and,
e. means for moving said fibrous applicator during said cycle into contact with said recording head and past two sides thereof.

3,875,579
THROUGH-THE-VIEWFINDER LIGHT SHADING DEVICE
Toshio Mochizuki, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo-to, Japan
Filed Sept. 10, 1973, Ser. No. 396,113
Claims priority, application Japan, Sept. 16, 1972, 47-107893
Int. Cl. G03b 19/12, 17/40, 7/08
U.S. Cl. 354—154 2 Claims



1. In a single lens reflex camera having an automatic exposure control system that is primarily responsive to light entering through the objective lens but that is subject to an error caused by light entering through the eyepiece of the camera viewfinder, the combination comprising a member movable into and out of a position where it blocks light entering through the eyepiece so that the exposure control system is rendered immune from said error; an energizable electromagnet including an armature; means including said armature for moving the member; a battery; electric current carrying conductors for conducting current for energizing the electromagnet; a switch having a normally open position and being closable to a complete circuit through which current supplied by the battery flows through the conductors to energize the electromagnet and a self-timer mechanism operative to sequentially close the switch and then return it to its normal position so that light measuring by the exposure control system is accomplished with the member blocking the error-causing light.

3,875,580
STRUCTURE FOR PREVENTING FAULTY CAMERA OPERATION
Koichiro Watanabe, Funabashi, and Fumio Urano, Wako, both of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Itabashi-ku, Tokyo-to, Japan
Filed May 23, 1973, Ser. No. 363,127
Claims priority, application Japan, May 31, 1972, 47-54026
Int. Cl. G03b 17/38
U.S. Cl. 354—268 5 Claims

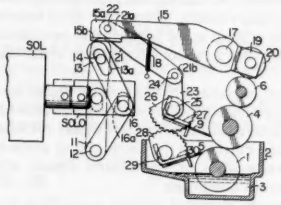


1. In a camera which can be operated mechanically as well as electrically, electromagnet means and armature means situated adjacent said electromagnet means to be situated thereby in an attracted position when said electromagnet means is energized and to be released for movement away from said attracted position to a rest position when said electromagnet means becomes unenergized, spring means acting on said armature means with a given force which resists movement of said armature means from said rest position to said attracted position thereof upon energizing of said electromagnet means, so that said electromagnet means when energized must exert a force at least equal to or greater than said given force to displace said armature means to said attracted position thereof, blocking means coacting with said armature means for assuming a blocking position when said armature means is in said rest position thereof and a non-blocking position when said armature means is in said attracted position thereof, and a camera element movable along a given path during normal camera operation, said blocking means when in said blocking position thereof extending across said path to prevent movement of said element along said path and thus prevent normal operation of the camera, so that unless said electromagnet means is capable of attracting said armature means to said attracted position thereof said blocking means will prevent normal operation of the camera, whereby a faulty camera condition which prevents said electromagnet means from exerting a force at least equal to or greater than said given force will prevent normal operation of the camera, selecting means for selecting between the mechanical and electrical operation, and cam means operatively connected with said selecting means and cooperating said said blocking means for automatically situating the latter in its non-blocking position when said selecting means is positioned to select mechanical operation, so that during mechanical operation the condition of the electrical structure is immaterial.

3,875,581
DEVELOPING DEVICE FOR COPYING APPARATUS OF THE DIAZO TYPE

Tadashi Yamashita, Yokohama, and Yasuhiro Takahashi, Tokyo, both of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed June 26, 1973, Ser. No. 373,892
Claims priority, application Japan, July 15, 1972, 47-71090
Int. Cl. G03d *5/00*
U.S. Cl. 354—318 **12 Claims**



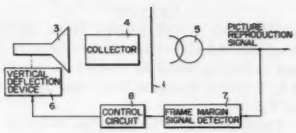
1. A developing device for copying apparatus of the diazo type comprising:
   a. an rotating applicator roller having a peripheral surface for applying a non-volatile concentrated developing liquid to a diazo photosensitive sheet exposed to an optical image of an original to be duplicated;
   b. a supply roller having a peripheral surface maintained in pressing engagement with said peripheral surface of the applicator roller to form therebetween an engaging position and rotating at approximately the same peripheral velocity as said applicator roller for supplying the developing liquid to the applicator roller;
   c. a control member maintained in pressing engagement with said peripheral surface of the supply roller in a position disposed anterior to the engaging position of said surfaces of the applicator and supply rollers along their paths of rotation for adjusting the quantity of the developing liquid supplied to the applicator roller;
   d. a pressing member maintained in pressing engagement with said applicator roller to form therebetween a developing position through which a diazo photosensitive sheet passes to be developed; and
   e. a removal member maintained in pressing engagement with said peripheral surface of the applicator roller in a position disposed posterior to the developing position along its path of rotation so as to remove any excess developing liquid from the applicator roller after a developing operation is performed and before any further developing liquid is supplied thereto.

3,875,582
FILM SCANNER

Motoi Yagi, Zushi, and Yutaka Ikusawa, Tokyo, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

Filed May 16, 1973, Ser. No. 360,892
Claims priority, application Japan, May 19, 1972, 47-49664; May 22, 1972, 47-50579
Int. Cl. H04n *9/00, 5/36*
U.S. Cl. 358—8 **5 Claims**

1. A control device for obtaining a still picture from an apparatus in which a video film is scanned by a flying spot scanner having a vertical deflection device and the video film has a plurality of luminance signal recorded frames and frames on which color signals are recorded together which pilot signals, each frame being separated from the others by a frame margin at a prescribed pitch, and a pair of the luminance signal recorded frame and color signal recorded frame being scanned simultaneously, said control device comprising:
   a frame margin signal detector for obtaining a frame margin signal corresponding to a frame margin from a picture signal produced by said scanning by detecting the lack of said pilot signal recorded on the frame margin; and
   a control circuit which comprises means for detecting a phase difference between the phase of a vertical synchronizing pulse of said vertical deflection device and that of

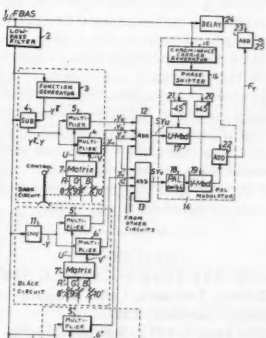


the frame margin signal to produce a control signal the amplitude of which is proportional to said phase difference, and means for supplying the control signal as a DC bias voltage to said vertical deflection device so as to displace vertically the position of the raster formed by said scanning and to bring the position into coincidence with that of the pair of frames.

3,875,583
CIRCUIT FOR MODIFYING COLOR CHARACTERISTICS

Dieter Poetsch, Am Pfarrweiher, and Horst Peth, Alsbach, both of Germany, assignors to Robert Bosch Fernsehanlagen GmbH, Darmstadt, Germany

Filed July 31, 1973, Ser. No. 384,260
Claims priority, application Germany, Aug. 1, 1972, 2237784
Int. Cl. H04n *9/535*
U.S. Cl. 358—27 **11 Claims**



1. A circuit for modifying color characteristics of a picture produced from a color video signal by modifying the color video signal, comprising:
   A. means for deriving a luminance signal from the color video signal,
   B. matrix means responsive to three adjustable d.c. signals representing three color components for forming first and second correction signals,
   C. first and second multiplier means both responsive as one input to the luminance signal and respectively responsive as a second input to first and second color difference signals for respectively generating first and second product signals,

D. means for modulating two quadrature components of a chrominance carrier signal derived from the color video signal respectively with the first and second product signals to derive first and second chrominance carrier components, and

E. means for additively combining the first and second chrominance carrier components and the color video signal to derive a modified color video signal.

3,875,584

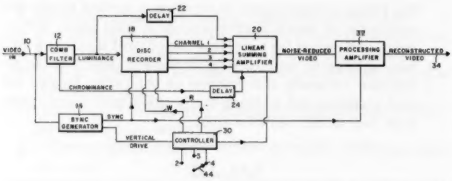
TELEVISION NOISE REDUCTION DEVICE

James C. Fletcher, Administrator of the National Aeronautics and Space Administration in respect to an invention of; Bernard L. Gordon, Houston, Tex., and James C. Stamps, La Porte, Tex.

Filed Oct. 17, 1973, Ser. No. 407,323

Int. Cl. H04n *9/00*

U.S. Cl. 358—36 **3 Claims**



3. A noise reducing system for reducing noise from television video signals including a succession of frames arriving on an input line, said system comprising:

separator means coupled to said input line for separating the video signals into their constituent luminance and chrominance components;

storage-and-reproducing means having at least two storage channels for consecutively storing the luminance components of incoming video frames from said input line, and selective combining means adapted to receive the outputs of said storage-and-reproducing means to weightingly combine the luminance component of each arriving video frame with the luminance component of one or more preceding recorded frame as selected whereby the resultant averaged combined luminance component signal has a higher signal-to-noise ratio compared to the signal-to-noise ratio of the individual frames, and said combining means recombining the separated chrominance component with the averaged luminance component signal to obtain a noise-reduced television signal.

3,875,585

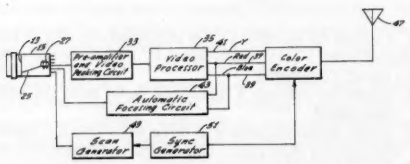
CATHODE RAY TUBE FOCUSSING SYSTEM

Thomas W. Burrus, Torrance, Calif., assignor to The Magnavox Company, Torrance, Calif.

Filed June 1, 1972, Ser. No. 258,904

Int. Cl. H04n *9/06*

U.S. Cl. 358—44 **4 Claims**



1. In combination for reproducing a color image:

first means for scanning the color image to produce signals representing a first and a second primary colors and a signal representing the luminance in the color image, the signals representing the first and second primary color having substantially the same frequency with differing phase, the first means including second means for focussing the first means on the color image during the scanning of the color image, wherein the first means provides a scanning beam and the second means includes a focus coil disposed relative to the scanning beam for producing a current to maintain the focus of the beam;

third means responsive to the signals representing the first and second primary colors for producing a low frequency control signal having characteristics dependent upon the characteristics of the signals representing the first and second primary colors, wherein the third means is reponsive to the current in the focus coil to provide the control signal with characteristics dependent upon this current; and

fourth means reponsive to the control signal for adjusting the focus provided by the first means in accordance with the characteristics of the control signal, the fourth means varying the current in the focus coil in accordance with the characteristics of the control signal, wherein the fourth means comprises:

first and second matched current controlling devices connected to each other at a first common terminal;

third and fourth matched current controlling devices connected to each other at a second common terminal;

the first and fourth current controlling devices connected to a reference signal and biased to conduct when the reference signal is positive;

the second and third current controlling devices connected to a source of operating potential and biased to conduct when the reference signal is negative;

fifth means having characteristics for dividing the conducted current between the first and second current controlling devices and the third and fourth current controlling devices in accordance with the phase of a particular voltage so that the magnitude of the correction current reflects the magnitude and direction of the focus coil current from the optimum value; wherein

the current conducted through the first, second, third and fourth current controlling devices remains substantially constant and the current conducted by the first and third current controlling devices is the correction current.

3,875,586

COLOR TELEVISION CAMERA

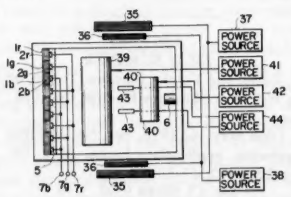
Shizuka Ishibashi, and Yoshizumi Eto, both of Hachioji, Japan, assignors to Hitachi, Ltd. and Hitachi Electronics Co., Ltd., both of Tokyo, Japan

Filed May 29, 1973, Ser. No. 364,426

Claims priority, application Japan, May 29, 1972, 47-52512

Int. Cl. H04n *9/06*

U.S. Cl. 358—44 **8 Claims**



1. A single pickup tube color camera comprising a color filter consisting of three kinds of periodically disposed stripe filter elements; three kinds of transparent stripe signal electrodes disposed respectively on said three kinds of stripe filter elements; a photoelectric transducing layer in contact with said transparent signal electrode; beam generating means for emitting an electron beam to scan said photoelectric transducing layer; control means for controlling said electron beam;

three kinds of signal terminals connected respectively with said three kinds of transparent stripe signal electrodes; means for applying to said signal terminals D.C. voltages and A.C. voltages having the same frequency but different phases; wherein the dot sequential signal corresponding to the three primary color images of the object is obtained from the currents derived at said signal terminals in response to the scanning by said electron beam, characterized in that said control means includes therein a means for defocusing said electron beam so as to increase the effective diameter of the beam spot on said photoelectric transducing layer.

3,875,587

COLOUR SCANNERS FOR IMAGE REPRODUCTION

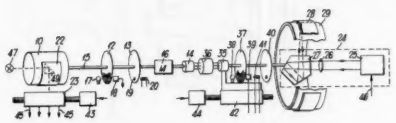
Peter C. Pugsley, Pinner, England, assignor to Crosfield Electronics Limited, London, England

Filed May 18, 1973, Ser. No. 361,804

Claims priority, application United Kingdom, May 19, 1972, 23751/72

Int. Cl. H04n *1/22, 1/46*

U.S. Cl. 358—80 **10 Claims**



1. A method of reproducing an image on a light-sensitive surface by scanning the surface with a light beam modulated in accordance with an electric signal obtained by scanning an original to be reproduced and representing the density or a color-component density of successively scanned elements of the original, the method comprising the steps of:

mounting the light-sensitive recording surface on the cylindrical surface of a non-rotating cylinder;

mounting a rotatable prism having a plurality of internal reflecting surfaces, with a number of said surfaces sequentially reflecting an incident light beam, within and on the axis of said cylinder and rotating said reflector about the said axis;

directing a light beam along the axis of said cylinder so that it is internally reflected by said number of surfaces internally to said cylindrical surface to define a circular track thereon; and

progressively displacing said circular track along said cylindrical surface to define a scanning raster on the said light-sensitive surface mounted on said cylindrical surface by relative movement of said cylinder and light-sensitive surface on the one hand and said prism on the other hand in a direction parallel to the axis of said cylinder.

3,875,588

MAGNETIC TAPE DUPLICATING APPARATUS

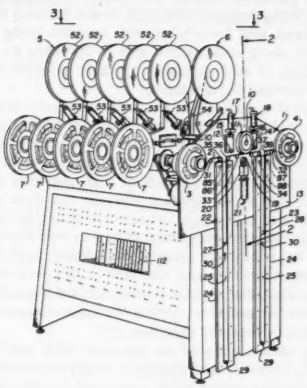
William P. Bennett, Northbrook, Ill., assignor to Programming Technologies, Inc., Chicago, Ill.

Filed Mar. 5, 1974, Ser. No. 448,412

Int. Cl. G11b *5/86, 15/22, 15/43*

U.S. Cl. 360—15 **20 Claims**

1. A magnetic tape duplicating apparatus for simultaneously recording information from a master tape on a plurality of slave tapes comprising, in combination, a play-back assembly for alternately transporting a master tape in a forward and reverse direction along a tape path including transducer means to pick up information therefrom while such tape is traveling in either direction; and a pair of multiple recording slave banks for duplicating said recorded information on a plurality of slave tapes; said banks being alternately operable such that all of the slave tapes of one bank are simultaneously recorded in the forward direction of the master tape, and all of the slave tapes of the other bank are simultaneously recorded in the reverse direction of the master tape to maintain



continuous multiple duplication in both master tape directions.

3,875,589

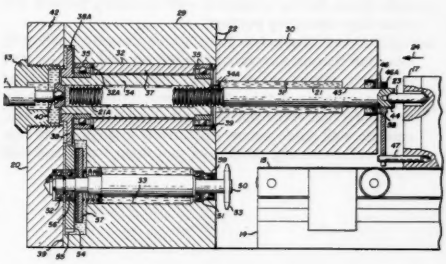
MODULAR SERVO TRACK WRITER WITH LINEAR POSITIONING

Roy A. Applequist, 401 Edgewood Rd., Redwood City, Calif. 94062, and Richard W. Rawie, 3197 Forbes Ave., Santa Clara, Calif. 95051

Filed Mar. 27, 1974, Ser. No. 455,414

Int. Cl. G11b *21/08*

U.S. Cl. 360—78 **15 Claims**



1. In a servo track writer system having at least one rotating disk with a servo information recording surface thereon and a transducer disposed for displacement relative to the disk for writing annular servo tracks on the disk, the combination comprising:

a drive shaft defining a first axis therethrough adapted to be rotatably driven about said first axis;

a drive means mounted on said drive shaft and being freely rotatable thereon;

a clutch plate rotatably carried by said drive shaft and frictionally engaged with said drive means so as to be adapted to continuously rotate said drive means;

an angularly movable member including means forming a first precision thread and having a detent wheel affixed thereto, said detent wheel including an outer surface that defines a diameter which is greater than the diameter of said first thread and having a plurality of detent teeth therearound, said angularly movable member being angularly movable about a second axis that is parallel to said

first axis and spaced therefrom a distance so as to be angularly driven by said drive means;

a linearly movable member including means forming a second precision thread, said means forming said first thread being engaged with said means forming said second thread, said linearly movable member being linearly movable along said second axis in response to angular movement of said angularly movable member so as to define a linear displacement;

a detent pawl including a detent face arranged to selectively engage said outer surface of said detent wheel, said pawl being pivotally movable between a detent position wherein said face selectively engages said outer surface so as to inhibit angular motion of said angularly movable member and a free position wherein said face is out of contact with said detent wheel such that said angularly movable member is angularly driven by said drive means;

means for selectively pivoting said detent pawl between said detent position and said free position so as to precisely control the angular position of said angularly movable member and consequently the linear displacement of said linearly movable member; and

accessing means adapted to interface with said linearly movable member and adapted to support a transducer, said accessing means being responsive to said linear displacement whereby extremely accurate displacement of said transducer relative to said servo surface may be achieved.

3,875,590

TAPE TRANSPORT ARRANGEMENT FOR CASSETTES WITH INTERLOCKS TO PREVENT TAPE DAMAGE

John Jerome Mandish, Huntington Beach, Calif., assignor to John Jazina, Los Angeles, Calif.

Filed Sept. 25, 1972, Ser. No. 292,181

Int. Cl. G11b *5/54, 15/24, 23/04*

U.S. Cl. 360—96 **21 Claims**

1. A tape cassette transport arrangement comprising, in combination:

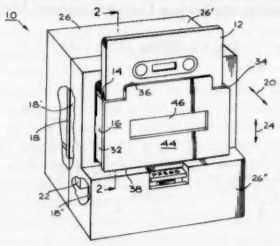
a main frame having a cassette well mounting portion and a carriage mounting portion;

a cassette well adapted to have a tape cassette removably mounted therein movably mounted on said cassette well mounting portion of said main frame for reciprocating motion between a tape cassette insertion-removal position and a read-write position and along a first linear axis;

cassette well guide means operatively engaging said cassette well mounting portion of said main frame and said cassette well for controlling movement of said cassette well along said first linear axis;

latch means coupled to said cassette well mounting portion of said main frame and operatively engaging said cassette well and having a latched position for restraining said cassette well in said read-write position, and an unlatched position, and said cassette well free to move along said first linear axis for said latch means in said unlatched position;

a carriage means movably mounted on said carriage mounting portion of said main frame for reciprocating motion towards and away from said cassette well between a read-write position wherein said carriage means is in tape read-write relationship to a tape in a tape cassette removably mounted in said cassette well for the condition of said cassette well in said read-write position thereof, and a retracted position free of contact with the tape in the



tape cassette for the condition of said cassette well in said tape cassette insertion removal position, and said carriage means movable along a second linear axis extending in directions different from said first linear axis;

carriage guide means operatively engaging said carriage mounting portion of said main frame and said carriage means for controlling movement of said carriage along said second axis; and

retaining means operatively engaging said cassette well and said carriage means, and having a first position for retaining said carriage means in said read-write position thereof for the condition of said cassette well in said read write position thereof, and a second position allowing movement of said cassette well from said read-write position thereof to said tape cassette insertion removal position for the condition of said carriage means in said retracted position.

DESIGN PATENTS

GRANTED APRIL 1, 1975

ERRATA

For CLASS	See PATENT NO.
86-10 F	234,677
09-177	234,679

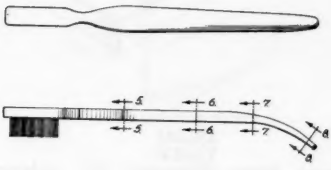
DESIGNS

APRIL 1, 1975

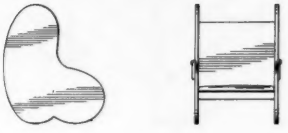
234,649
FOUNDATION GARMENT
Jack J. Lo Cascio, Bayonne, N.J., assignor to International Playtex Corporation, New York, N.Y.
Filed Aug. 6, 1973, Ser. No. 386,138
Term of patent 14 years
Int. Cl. D2—*01*
U.S. Cl. D2—3

234,650
HELMET
Eitaro Kamata, 17 Mejirodai, 1-chome, Bunkyo-ku, Tokyo, Japan
Filed Apr. 4, 1973, Ser. No. 347,911
Claims priority, application Japan Nov. 11, 1972
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—232

234,651
ORAL HYGIENE TOOL
Berdell Buckley, Awbury, Philadelphia, Pa. 19138
Filed Feb. 27, 1973, Ser. No. 336,221
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—24

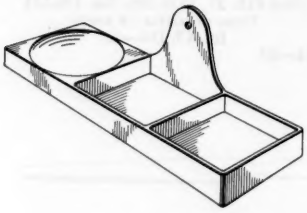


234,652
INVERTIBLE CHAIR FOR AN INFANT
Earl R. Schug, San Bruno, Calif.
(135 S. La Salle St., Suite 1123, Chicago, Ill. 60603)
Filed Jan. 24, 1973, Ser. No. 326,469
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—3



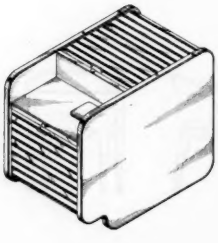
234,653
CHAIR
Naomichi Morishita, Ohta, Japan, assignor to France Bed Co., Ltd., Tokyo, Japan
Filed Feb. 28, 1973, Ser. No. 336,440
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—70

234,654
HOLDER FOR SOAP AND OTHER ARTICLES
Ann Woody, Rte. 1, Box 107F, Otis, Oreg. 97368
Filed July 15, 1974, Ser. No. 488,474
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—90

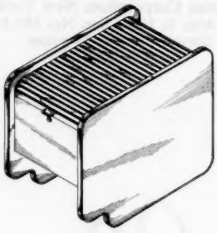


234,655
TABLE
Frank Joseph Stiene, Ridgewood, N.J., assignor to Mercedes-Benz of North America, Inc., Montvale, N.J.
Filed Aug. 21, 1972, Ser. No. 282,573
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—146

234,656
STORAGE CABINET
Frank Joseph Stiene, Ridgewood, N.J., assignor to Mercedes-Benz of North America, Inc., Montvale, N.J.
Filed Aug. 21, 1972, Ser. No. 282,575
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—150



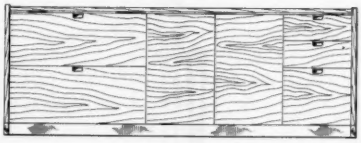
234,657
FILE
Frank Joseph Stiene, Ridgewood, N.J., assignor to Mercedes-Benz of North America, Inc., Montvale, N.J.
Filed Aug. 21, 1972, Ser. No. 282,579
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—150



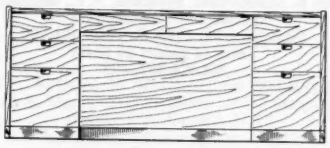
234,658
SPORTS ACCESSORY RACK
Dee L. Tillinger, Laredo Air Force Base, Laredo, Tex.
Filed July 3, 1972, Ser. No. 268,722
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—157

234,659
STORAGE UNIT
Ronald R. Hodges, 5577 Kenowa SW., Grandville, Mich. 49418, and Robert Keeler, 1013 Van Ess NW., Grand Rapids, Mich. 49504
Filed May 22, 1973, Ser. No. 363,166
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—159

234,660
CREDENZA
Douglas C. Ball, Senneville, Quebec, Canada, assignor to Massey-Ferguson Industries Limited, Toronto, Ontario, Canada
Filed Aug. 30, 1973, Ser. No. 393,256
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—160

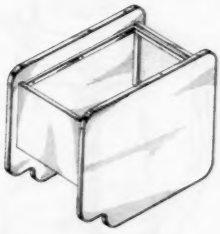


234,661
DESK
Douglas C. Ball, Senneville, Quebec, Canada, assignor to Massey-Ferguson Industries Limited, Toronto, Ontario, Canada
Filed Aug. 30, 1973, Ser. No. 393,255
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—161

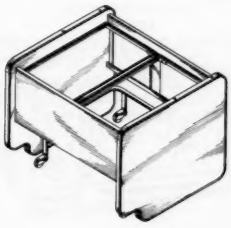


234,662
TABLE
Frank Joseph Stiene, Ridgewood, N.J., assignor to Mercedes-Benz of North America, Inc., Montvale, N.J.
Filed Aug. 21, 1972, Ser. No. 282,574
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177

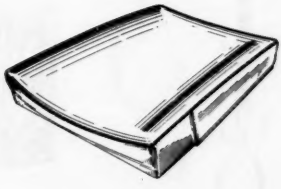
234,663
OPEN FILE
Frank Joseph Stiene, Ridgewood, N.J., assignor to Mercedes-Benz of North America, Inc., Montvale, N.J.
Filed Aug. 21, 1972, Ser. No. 282,577
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—181



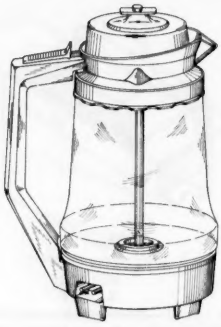
234,664
FILE
Frank Joseph Stiene, Ridgewood, N.J., assignor to Mercedes-Benz of North America, Inc., Montvale, N.J.
Filed Aug. 21, 1972, Ser. No. 282,580
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—186



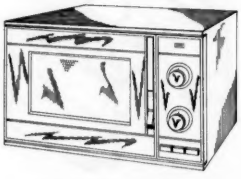
234,665
BACK CUSHION FOR AN OPHTHALMIC CHAIR
John T. Armbruster, Niagara Falls, N.Y., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 26, 1973, Ser. No. 336,092
Term of patent 14 years
Int. Cl. D6—*09*
U.S. Cl. D6—201



234,666
COFFEE PERCOLATOR
Thomas E. Hanson, Philadelphia, Pa., assignor to SCM Corporation
Filed Sept. 17, 1973, Ser. No. 398,036
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—62



234,667
MICROWAVE OVEN
Peter E. Linder, Southfield, Mich., assignor to The Tappan Company, Mansfield, Ohio
Filed Sept. 20, 1973, Ser. No. 399,055
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—128



234,668
SPOON OR SIMILAR ARTICLE
Melvin A. Lea, Oneida, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed Aug. 31, 1973, Ser. No. 393,656
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

234,669
SPOON OR SIMILAR ARTICLE
Melvin A. Lea, Oneida, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed Aug. 31, 1973, Ser. No. 393,657
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

234,670
SPOON OR SIMILAR ARTICLE
Ellen B. Manderfield, Syracuse, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed Sept. 28, 1973, Ser. No. 401,709
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

234,671
SPOON OR SIMILAR ARTICLE
Robert S. Conland, Vernon, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed Sept. 28, 1973, Ser. No. 401,710
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

234,672
SPOON OR SIMILAR ARTICLE
Ellen B. Manderfield, Syracuse, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed Oct. 4, 1973, Ser. No. 403,641
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

234,673
SPOON OR SIMILAR ARTICLE
Ellen B. Manderfield, Syracuse, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed Oct. 15, 1973, Ser. No. 406,380
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

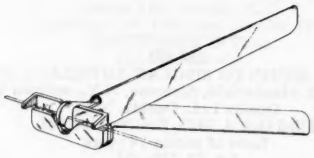
234,674
SPOON OR SIMILAR ARTICLE
Colin B. Richmond II, Oneida, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed Nov. 23, 1973, Ser. No. 418,255
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

234,675
SPOON OR SIMILAR ARTICLE
Colin B. Richmond II, Oneida, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed Nov. 23, 1973, Ser. No. 418,256
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

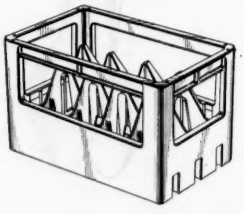
234,676
SPOON OR SIMILAR ARTICLE
Frank R. Perry, Oneida, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed Nov. 29, 1973, Ser. No. 420,012
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—150

234,677
HAIR DRYER
Otto Hubner, 199 Mauerkircherstrasse, 8000 Munich 81, Germany
Filed June 11, 1973, Ser. No. 369,054
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 F

234,678
WIRE TIGHTENER
Frank J. Jellinek, R.R. 1, Bismark, Mo. 63624
Filed Feb. 2, 1973, Ser. No. 329,032
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—44



234,679
BOTTLE CRATE
Kashichi Hirota, Tokyo, Japan, assignor to Kyowa Denki Kagaku Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 26, 1972, Ser. No. 301,070
Claims priority, application Japan Apr. 27, 1972
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—177

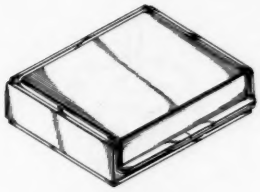


234,680
COMBINATION GUARDED INSERT AND GADGET SUPPORTING DEVICE
Robert N. Cox, Cranbury, N.J., assignor to Etamco Industries, Belleville, N.J.
Filed May 10, 1973, Ser. No. 361,397
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—243

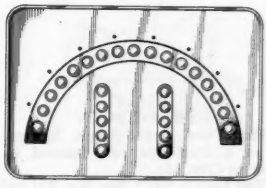
234,681
ANTI-SKID CHAIN LINK
Erik Herbert Carlsson, Overum, Sweden, assignor to Aktiebolaget Overums Bruk, Overum, Sweden
Filed July 2, 1973, Ser. No. 375,545
Claims priority, application Sweden Jan. 9, 1973
Term of patent 14 years
Int. Cl. D8—*99;* D10—*07*
U.S. Cl. D8—262

234,682
BOTTLE OR SIMILAR ARTICLE
Duane J. Quintal, P.O. Box 1, Quezon City, Philippines
Continuation-in-part of abandoned design application Ser. No. 22,013, Mar. 23, 1970. This application Jan. 20, 1972, Ser. No. 219,614
Claims priority, application Philippines Sept. 25, 1969
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—143

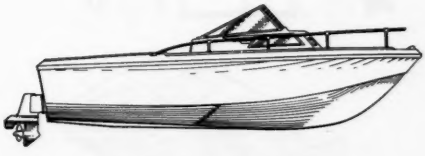
234,683
BOX FOR SEWING MACHINE ATTACHMENTS OR THE LIKE
Joseph G. Rakacs, Toms River, N.J., assignor to The Singer Company, New York, N.Y.
Filed Apr. 26, 1973, Ser. No. 354,410
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—234



234,684
COMBINED TACHOMETER, OIL AND TEMPERATURE INSTRUMENT
John M. Olson, 1513 7th St., Port Hueneme, Calif. 93041
Filed Mar. 29, 1973, Ser. No. 345,904
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—98

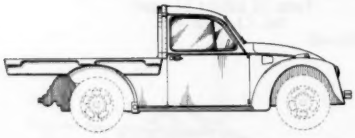


234,685
FISHING CRUISER
Richard C. Cole, 19701 Whispering Pines Road, Miami, Fla. 33157
Filed Aug. 7, 1973, Ser. No. 386,301
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



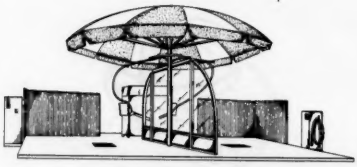
234,686
HELICOPTER
Charles M. Seibel, 916 Live Oak Lane, Arlington, Tex. 76010
Filed Mar. 26, 1973, Ser. No. 343,623
Term of patent 14 years
Int. Cl. D12—*07*
U.S. Cl. D12—73

234,687
TRUCK BODY
James M. Tharp and Drake Koch, Kansas City, Mo., assignors of a fractional part interest to James M. Tharp, Kansas City, Mo.
Filed Dec. 1, 1972, Ser. No. 311,155
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—98

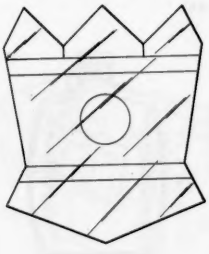


234,688
BICYCLE LUGGAGE CARRIER
Arthur R. Westermann, 2328 E. Osborn Road, Phoenix, Ariz. 85016
Filed May 25, 1973, Ser. No. 364,040
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—158

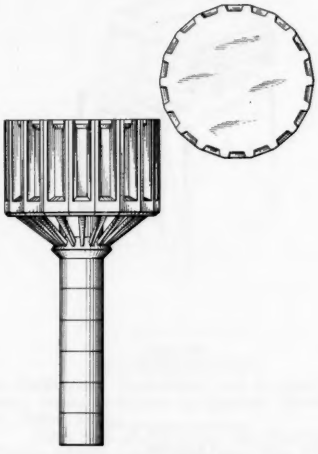
234,689
VEHICLE WASH INSTALLATION
James E. Widner, Grandview, Mo., assignor to Robo Wash, Inc., Kansas City, Mo.
Filed Dec. 4, 1972, Ser. No. 311,686
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D13—1 B



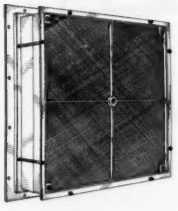
234,690
DECORATIVE LABEL-TYPE EMBLEM
Louis Wimberly, P.O. Box 1, Litchfield, Ill. 60538
Filed Aug. 13, 1973, Ser. No. 388,159
Term of patent 14 years
Int. Cl. D19—*08*
U.S. Cl. D19—13



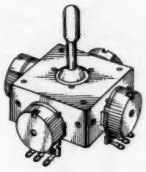
234,691
WATER TOWER
Matti Janhunen, Kiertotie 2, Westend, Finland
Filed Dec. 8, 1972, Ser. No. 313,430
Claims priority, application Finland May 25, 1972
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—2



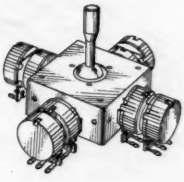
234,692
COMBINED FILTER AND OVER-PRESSURE VALVE FOR AIR RAID SHELTERS
Launo Laakkonen, Helsinki, Finland, assignor to Temet Oy, Helsinki, Finland
Filed Oct. 9, 1973, Ser. No. 404,181
Claims priority, application Finland Apr. 10, 1973
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—149



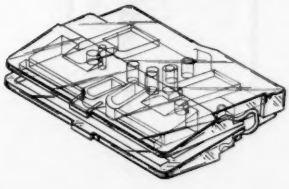
234,693
VARIABLE RESISTOR
Shunzo Oka, Hirakata, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jan. 28, 1972, Ser. No. 221,845
Claims priority, application Japan July 29, 1971
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 D



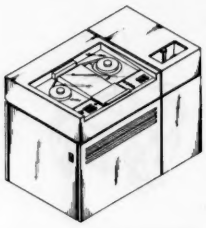
234,694
VARIABLE RESISTOR
Shunzo Oka, Hirakata, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jan. 28, 1972, Ser. No. 221,846
Claims priority, application Japan July 29, 1971
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 D



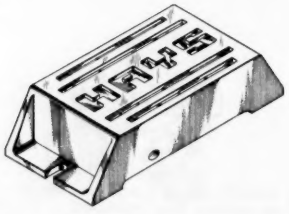
234,695
RELEASABLE CLAMP FOR GROUND PLATE ELECTRODE
Robert K. Anderson, Boulder, Colo., assignor to Valleylab, Inc., Boulder, Colo.
Filed Feb. 9, 1972, Ser. No. 225,025
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 A



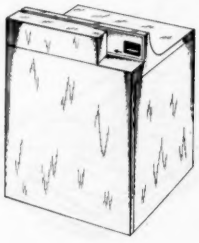
234,696
DATA CONVERTER FOR AUTOMATIC DATA PROCESSING
Charles A. Pycha and Frank Wilkey, Jr., Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Mar. 27, 1973, Ser. No. 345,404
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C



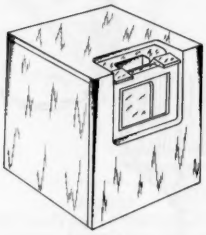
234,697
CASE FOR ELECTRONIC COMPONENTS FOR ENGINE IGNITION SYSTEMS
Bill J. Hays, Garden Grove, Calif., assignor to Bill J. Hays International Inc., Midway City, Calif.
Filed Apr. 2, 1973, Ser. No. 346,924
Term of patent 14 years
Int. Cl. D13—*01*
U.S. Cl. D26—5 R



234,698
MAGNETIC STRIPE CARD READER OR THE LIKE
Ronald I. Conway, Port Ewen, Robert V. Jones, Kingston, John J. Natoli, Woodstock, and John V. Stram, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed July 16, 1973, Ser. No. 379,877
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C

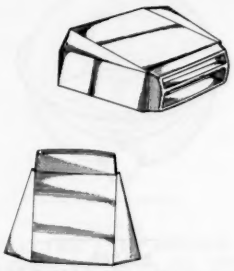


234,699
CARD READER OR THE LIKE
Ronald I. Conway, Port Ewen, Robert V. Jones, Kingston, John J. Natoli, Woodstock, and John V. Stram, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed July 16, 1973, Ser. No. 379,878
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C

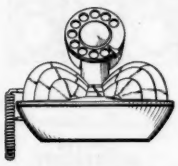


234,700
DISC DRIVE CABINET
Moto Shimano, Los Angeles, and Lloyd Y. Ishimaru, Agoura, Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Nov. 15, 1973, Ser. No. 416,143
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C

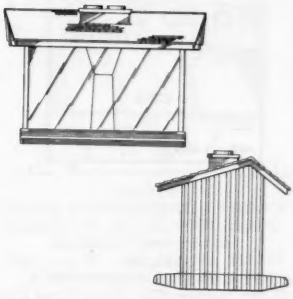
234,701
AUTOMOBILE STEREO TAPE PLAYER
Maurice H. Kraines, Beverly Hills, Calif., assignor to Kraco Enterprises, Inc., Compton, Calif.
Filed Nov. 21, 1972, Ser. No. 308,421
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 B



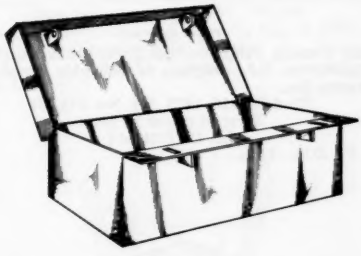
234,702
TELEPHONE SET
Tsutae Kuribayashi, Sagamihara, and Kenichi Fukunaga, Tokyo, Japan, assignors to Tamura Electric Works, Ltd., Tokyo, Japan
Filed Nov. 13, 1973, Ser. No. 415,315
Claims priority, application Japan May 16, 1973
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A



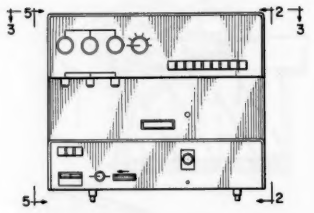
234,703
BIRD FEEDER
James C. Fry, Wooster, Ohio, assignor to Rubbermaid Incorporated, Wooster, Ohio
Filed May 18, 1973, Ser. No. 361,799
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—13



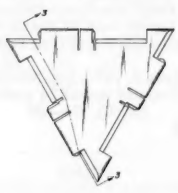
234,704
SECURITY CHEST
James S. Frantz, Red Lane Extension, and Lanier Frantz, 972 Stonegate Drive, both of Salem, Va. 24153, and George A. Cole, 4529 Royal Oak Drive SW., Roanoke, Va. 24014
Filed June 5, 1973, Ser. No. 367,235
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D31—22



234,705
BLOOD GAS ANALYZER
Robert J. Gomes, Plymouth, and James R. Lindenthal, Franklin, Mass., and Joseph A. A. Mankowski, Painted Post, N.Y., assignors to Corning Glass Works, Corning, N.Y.
Filed Mar. 17, 1972, Ser. No. 235,880
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D32—2

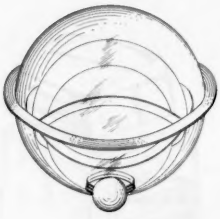


234,706
TOY CONSTRUCTION PIECE
Edward Henry Harvey, The Verne, Moor Common, Lane End, England
Filed Sept. 12, 1972, Ser. No. 288,299
Claims priority, application Great Britain Mar. 16, 1972
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 GG

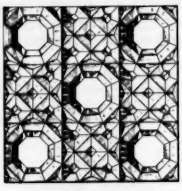


234,707
TOY SHAPE
Jorma Vennola, Princeton, and Erkki Pekka Korpijaako, Hightstown, N.J., assignors to Columbia Broadcasting System, Inc.
Filed Feb. 16, 1973, Ser. No. 333,388
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 A

234,708
PUZZLE TOY
Todd M. Rostock, 219—36 67th Ave., Bayside, N.Y. 11364
Filed Apr. 9, 1973, Ser. No. 349,039
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 M



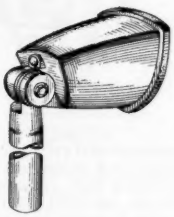
234,709
APERTURED PRISMATIC COVER PLATE FOR CLIMATE LIGHTS
Friedrich Clostermann, 11 Kreishausstr., 5800 Hagen, Germany
Filed May 4, 1973, Ser. No. 357,286
Claims priority, application Germany Nov. 7, 1972
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—16 A



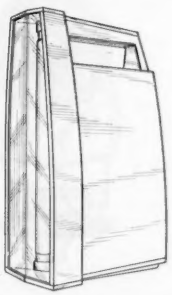
234,710
SPOTLIGHT
Aloysius-Jacobus-Maria Beeren, Nuenen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed May 29, 1973, Ser. No. 364,553
Claims priority, application Netherlands Nov. 27, 1972
Term of patent 14 years
Int. Cl. D26—*03*
U.S. Cl. D48—20 K

234,711
NECK SUPPORTED LAMP
Othmar W. Pies, 200 W. Galbraith Road, Cincinnati, Ohio 45215
Filed Aug. 27, 1973, Ser. No. 391,785
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 E

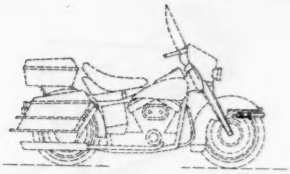
234,712
ELECTRIC LAMP HOLDER
Richard T. Kennedy, Oak Lawn, and James L. Hvale, Chicago, Ill., assignors to Bell Electric Company, Chicago, Ill.
Filed Oct. 29, 1973, Ser. No. 410,738
Term of patent 14 years
Int. Cl. D26—*03*
U.S. Cl. D48—20 K



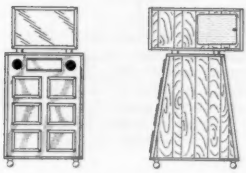
234,713
PORTABLE FLUORESCENT LIGHT
Milton E. Wilke, Freeport, Ill., and Donald Wayne Doman, Janesville, Wis., assignors to Gould Inc., Chicago, Ill.
Filed July 26, 1974, Ser. No. 492,349
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 R



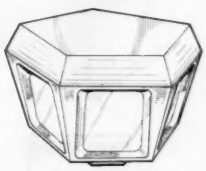
234,714
MOTORCYCLE TURN SIGNAL LAMP
Sherman E. Taylor, 3307 N. MacArthur, Oklahoma City, Okla. 73104
Filed May 16, 1973, Ser. No. 360,679
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 E



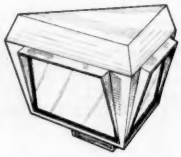
234,715
MOVIE ADVERTISING CABINET
Bradford W. Stevens, 1969 Higbee, Memphis, Tenn. 38104
Filed Jan. 22, 1973, Ser. No. 325,888
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D61—1 N



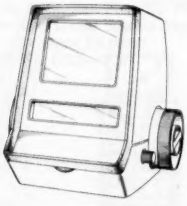
234,716
MULTI-SCREEN FILM PROJECTOR
Per Erik Gustaf Ljung, Vallentuna, Nils Gunnar Lindell, Vasby, and Stig Bertil Hogdal, Bromma, Sweden, assignors to Videogram Production AB, Malmo, Sweden
Filed June 5, 1973, Ser. No. 367,208
Claims priority, application Sweden Dec. 7, 1972
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D61—1 N



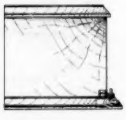
234,717
MULTI-SCREEN FILM PROJECTOR
Per Erik Gustaf Ljung, Vallentuna, Nils Gunnar Lindell, Vasby, and Stig Bertil Hogdal, Bromma, Sweden, assignors to Videogram Production AB, Malmo, Sweden
Filed June 5, 1973, Ser. No. 367,211
Claims priority, application Sweden Dec. 7, 1972
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D61—1 N



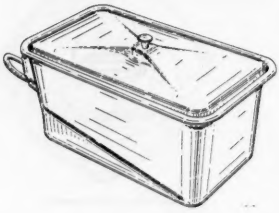
234,718
MICROFICHE VIEWER
Stephen G. Hauser, Tarzana, Ralph M. Bergo, Playa del Rey, and John Goodin, Long Beach, Calif., assignors to UMF Systems Incorporated, Los Angeles, Calif.
Filed Aug. 8, 1973, Ser. No. 386,601
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D61—1 N



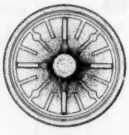
234,719
COMPRESSOR HOUSING FOR A SPHYGMOMANOMETER
Anthony D. Colasante, Oakland Road, Butztown, Pa. 18017
Filed Aug. 7, 1972, Ser. No. 278,612
Term of patent 14 years
Int. Cl. D15—*02*; D24—*02*
U.S. Cl. D65—1 A



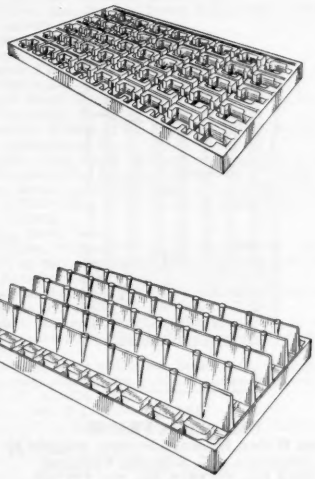
234,720
WAX TREATMENT BATH FOR USE IN HEAT THERAPY
John Edward Runnquist, 39 Kirby Cliff, Lowestoft, England, and John Woodcraft, 13 Oak Way, Halesworth, England
Filed Apr. 15, 1971, Ser. No. 134,534
Claims priority, application Great Britain Oct. 16, 1970
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—1 C



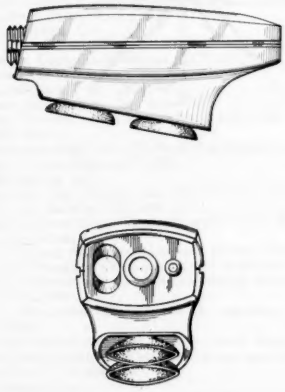
234,721
FILTER FOR AN OXYGENATION SYSTEM
David J. Rosenberg, Glen Cove, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.
Filed June 16, 1972, Ser. No. 263,497
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—1 R



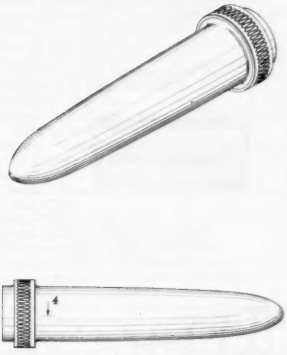
234,722
TRAY FOR UNITARY DOSAGE SYSTEM
Donald E. Head and Paul W. Gerding, Columbus, Ind., assignors to Uniscript, Inc., Fort Wayne, Ind.
Filed Aug. 24, 1972, Ser. No. 283,550
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—1 U



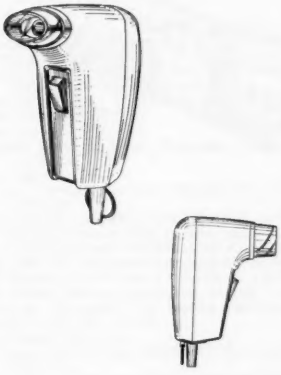
234,723
NOZZLE FOR A HYDROMASSAGE UNIT
Robert H. Hurst, Barrington, R.I., assignor to Clevepak Corporation, New York, N.Y.
Filed Oct. 13, 1972, Ser. No. 297,445
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—1 C



234,724
CORDLESS ELECTRIC VIBRATOR
John H. Tavel, 17643 Belinda St., Encino, Calif. 91316
Filed Jan. 31, 1973, Ser. No. 328,252
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D83—1 T

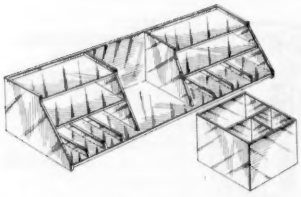


234,725
ELECTRIC MASSAGER
Hiromiti Yamada, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Mar. 2, 1973, Ser. No. 337,697
Claims priority, application Japan Sept. 4, 1972
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D83—1 T

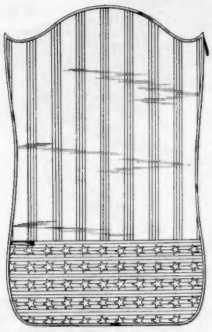


234,726
HAIR CURLER DISPENSING TRAY
James F. Severino, 1602 29th St.,
Des Moines, Iowa 50310
Filed Apr. 17, 1973, Ser. No. 352,039
Term of patent 7 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 E

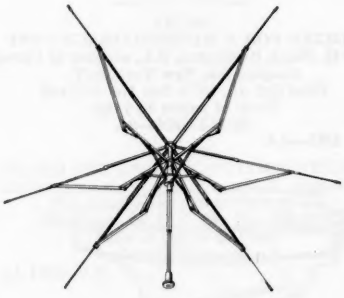
234,727
COSMETIC VANITY CONTAINER
Rebecca Mark, 195 Turn of River Road,
Stamford, Conn. 06905
Filed May 14, 1973, Ser. No. 360,005
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 A



234,728
GARMENT BAG
Sidney Annis, 50 Cooper Square,
New York, N.Y. 10003
Filed May 22, 1972, Ser. No. 255,924
Term of patent 14 years
Int. Cl. D3—*99*
U.S. Cl. D87—1 R



234,729
UMBRELLA FRAME
Heinz Weber, Hilden, Germany, assignor to
Bremshey AG, Solingen, Germany
Filed Jan. 27, 1972, Ser. No. 221,209
Term of patent 14 years
Int. Cl. D3—*03*
U.S. Cl. D88—3 R



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TO WHOM

PATENTS WERE ISSUED ON THE 1ST DAY OF APRIL, 1975

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Balme, Maurice, to Rhone-Poulence S.A. Linear polyimides prepared from bis-imides, tertiary phosphines and dialdehydes. 3,875,115, Cl. 260-47.0UA.
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Begat, Vincent. Gearbox. 3,874,252, Cl. 74-802.000.
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Blair, Lloyd R.; Meyer, Robert E.; Rose, Dennis H.; Smith, James E.; and Steinfeldt, Jack E., to United States of America, Army. Recording system using gas laser. 3,874,621, Cl. 346-108.000.
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Bopp, Louis A.; Jachimowicz, Ludwik; and Schmidt, Gertraud A., to General Cable Corporation. Waterproof telephone cables with pliable non-flowing filling compound. 3,875,323, Cl. 174-23.00C.
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Boyett, Dallas T. Apparatus for inert gas shielded welding. 3,875,364, Cl. 219-74.000.
Boyle, John Terence Arnott: *See—*
Archibald, John Leheup; Boyle, John Terence Arnott; and Saunders, John Christopher, 3,875,165.
Braber, Robert J., to Lehigh Press, Inc., The. Packaging method and apparatus. 3,874,143, Cl. 53-14.000.
Bradley, Earl K. Method for monitoring a classroom. 3,875,337, Cl. 179-1.0VC.
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Brandl, Herman; Kaiser, Hermann; Richert, Hans; Rozanski, Franz; Suchy, Herbert; and Hunecke, Theodor, to Bayer Aktiengesellschaft. Recovery of reaction products of hydrazine and carbonyl compounds. 3,875,231, Cl. 260-566.00B.
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Brandt, Harry J., to Brandt Automasonary Corporation. Masonry wall constructing process. 3,875,278, Cl. 264-90.000.
Brassat, Bert; and Reinking, Klaus, to Bayer Aktiengesellschaft. Activated anionic polymerization of lactams. 3,875,121, Cl. 260-78.00L.
Bratton, Raymond J.; and Ho, Shih M., to Westinghouse Electric Corporation. Method for making polycrystalline alumina arc tubes. 3,875,277, Cl. 264-65.000.
Brauer, William Alvin. Vehicle position indicator. 3,874,322, Cl. 116-28.00R.
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Brethen, Chester Arthur. Exercise device. 3,874,660, Cl. 272-81.000.
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Bridgham, John A., to Hewlett-Packard Company. Infrared radiation source. 3,875,413, Cl. 250-492.000.
Bridgland, Brian Edward; Massy, Derek James Rowland; and Stark, Bernard Peter, to Ciba-Geigy AG. Compositions resistant to burning. 3,875,109, Cl. 260-45.70R.
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Tharman, Paul A., 3,875,438.
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British Nuclear Fuels Limited: *See—*
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Brock, James Donald; Mize, Erbie Gail; and Jakob, Herbert Edward, to CMI Corporation. Asphalt mix preparation and storage plant. 3,874,523, Cl. 214-17.00R.
Brodrene Asia A/S: *See—*
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Buck, Robert J., to Berkey Photo, Inc. Photoflash source control circuit. 3,875,471, Cl. 315-151.000.
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Bueckert, Clarence W. Antenna tower. 3,875,573, Cl. 343-882.000.
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Buser, Rudolf G.; and Kaunzinger, Helmuth M., to United States of America, Army. Electrostatic field measuring device. 3,874,616, Cl. 244-17.110.
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Caravello, Ronald G.; and Mickowski, John, to Porta Systems Corp. Cable pair test apparatus. 3,875,352, Cl. 179-175.20R.
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Carter, Paul H., deceased; by Carter, Leona Marie Carter, personal representative; and Marion, Thomas E., to Maryland Cup Corporation. Apparatus for post treating preformed foam containers. 3,874,830, Cl. 425-4.00R.

Case, Walter; and Benefield, William F. Fluid actuated brake locking mechanism. 3,874,747, Cl. 303-89.000.

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Catlin, Robert T.; Dawson, Chester H.; and Haskell, Philip R., to Remington Arms Company, Inc. Flexible hand held abrading tool. 3,874,126, Cl. 51-393.000.

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Chevalier, Andre, to Institut Francais du Petrole, des Carburants et Lubrifiants. Process for securing a rigid coupling to one end of an armored flexible pipe. 3,874,064, Cl. 29-460.000.

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Choi, Sam Kwon, to Chevron Research Company. Polymerization of 2-pyrrolidone. 3,875,147, Cl. 260-239.30R.

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Christensen, Don C., to George E. Baumann, a part interest. Glass rod and reel construction. 3,874,489, Cl. 191-12.20R.

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Clark, Charles R.; Gregory, M. Duane; Kerfoot, Oliver C.; Veatch, Fred C.; Krehbiel, Delmar D.; and Kennedy, Carl D., to Continental Oil Company. Waterflooding method using overbased sulfonate. 3,874,454, Cl. 166-270.000.

Clark Equipment Company: *See—*
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Clay, Robert B. Pneumatic pump surge chamber. 3,874,417, Cl. 138-30.000.

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Coburn, Orin W.; and Stith, Joe D., to Coburn Optical Industries, Inc. Vacuum chuck with sealable cavity. 3,874,127, Cl. 51-216.0LP.

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Cocker, John, III. Search and recovery device. 3,874,325, Cl. 116-124.00B.

Cocuzza, Gioacchino; Montoro, Italo; and Calcagno, Benedetto, to Societa' Italiana Resine S.I.R. S.p.A. Recovery of ethylene glycol by plural stage distillation using vapor compression as an energy source. 3,875,019, Cl. 203-18.000.

Coenen, Willem Frans. Open roof structure for a vehicle. 3,874,723, Cl. 296-137.00J.

Coes, Samuel H.: *See—*
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COFPA-compagnie Des Feutres Pour Papeteries Et Des Tissus Industriels: *See—*
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Cogliano, Joseph A.; Wood, Louis L.; and Frisch, Kurt C., to W. R. Grace & Co. Laminated fabric and method. 3,874,964, Cl. 156-78.000.

Cohen, Choua; Giuliani, Pierre; and Sillion, Bernard, to Institut Francais du Petrole des Carburants et Lubrifiants. Meta-and para-phenylene-bis(4-hydroxymethylene-phthalic acids and the diester and tetraester thereof. 3,875,208, Cl. 260-473.00R.

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Cole, Henry B., to American Optical Corporation. Numerical aperture expansion in fiber optic devices. 3,874,783, Cl. 350-96.00B.

Cole, William Lloyd, to Greene, Orville N., a part interest. Prescription tooth-cleansing and gingival therapeutic device. 3,874,084, Cl. 32-40.00R.

Colgate-Palmolive Company: *See—*
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Collie, Stafford D., to Phillips Petroleum Company. Snap action closure with concentric annular flex zones. 3,874,567, Cl. 222-499.000.

Collins Pine Company: *See—*
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Collins, Richard Clement; Mayer, John Donald; and Thompson, Bernard Britton, to Boeing Company, The. Reciprocating powered wheel drive. 3,874,619, Cl. 244-50.000.

Colombo, Jospeh G. Electrical connector socket for integrated circuit. 3,874,759, Cl. 339-17.0CF.

Colonial Sugar Refining Company Limited, The: *See—*
Glasziou, Kenneth Trevor; and Slack, Charles Roger, 3,875,009.

Color Control, Inc.: *See—*
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Columbia Broadcasting System, Inc.: *See—*
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Columbia Ribbon and Carbon Manufacturing Co., Inc.: *See—*
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Commonwealth of Australia, The: *See—*
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Communication Mfg. Co.: *See—*
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Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
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Compania de Aero del Pacifico S.A.(Chile): *See—*
Vera, Carlos Molina; Guzman, Carlos Vilches; and Soto-Krebs, Luis, 3,874,940.

Compton, William A.; Duffy, Thomas E.; and Seegall, Manfred I., to International Harvester Company. Apparatus using radioactive particles for measuring gas temperatures. 3,874,238, Cl. 73-339.00R.

Computron, Inc.: *See—*
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Cone, Irwin C., to Gates Rubber Company, The. Hinge arrangement for articulated windshield wiper blades. 3,874,025, Cl. 15-250.420.

Conlan, William A.: *See—*
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Connaught Laboratories Limited: *See—*
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Conner, Joseph R.; Mayer, George E.; and Shovlin, Thomas F., to Bemis Company, Inc. Automatic batt packer and method of packing. 3,874,281, Cl. 100-35.000.

Connor, Loly V. Device for determining the depth of a trolling plug. 3,874,108, Cl. 43-25.000.

Continental Oil Company: *See—*
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Poundstone, William N.; and Miller, William J., 3,874,733.
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Cook, Albert N.; and Suchsland, Alfred R., to Singer Company, The. Electric cam selector mechanism for sewing machines. 3,874,312, Cl. 112-158.00C.

Cook, Calvin S.: *See—*
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Cook, Lawrence E., to Dynamics Corporation of America. Wave soldering electrical connections. 3,874,068, Cl. 29-471.100.

Cooke, George A.; and Houlihan, William J., to Sandoz-Wander, Inc. 1-Substituted-6,7-methylenedioxy-quinozalin-2(1H)-thiones. 3,875,093, Cl. 260-251.0QB.

Coons, Harold L.; and Highfill, Jack L., to ISCO Manufacturing Company, Inc. Rail draft vehicle. 3,874,306, Cl. 105-26.00R.

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Corley, Robert C.; and Dewey, Fred M., to United States of America, Air Force. Use of 1,1'-bis-(1-glycidoxylalkyl) ferrocenes in rocket propellants. 3,874,957, Cl. 149-5.000.

Corn Refiners Association, Inc.: *See—*
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Corning Glass Works: *See—*
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Thiel, Frank L., 3,874,781.

Costa, Lorenzo F.; Van Allan, James A.; and Grum, Frank, to Eastman Kodak Company. Photothermographic element, composition and process. 3,874,946, Cl. 96-48.0HD.

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Coulbourn, John. Anti-pull animal leash mechanism. 3,874,339, Cl. 119-29.000.

Coulter Diagnostics, Inc.: *See—*
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Cover, Paul F.; Rife, John W.; and Kemper, Clyde F., to United Company, The. Apparatus for and method of orienting articles having at least one tapered end. 3,874,498, Cl. 198-254.000.

Cowley, Gary. Articulated column drafting table. 3,874,309, Cl. 108-2.000.

CPC International, Inc.: *See—*
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Craven, Eugene J. Extruded metal construction element. 3,874,135, Cl. 52-98.000.

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Crocker, Thomas H.; and Levitt, Barry N., to Raytheon Company. Inertially stabilized gimbal platform. 3,875,488, Cl. 318-648.000.

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Cronheim, Richard B. Card holder. 3,874,501, Cl. 206-73.000.

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Crosfield Electronics Limited: *See—*
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Crosswhite, Bert. Conveyor system for wheeled carts. 3,874,302, Cl. 104-172.00B.

Crouch, Thomas J., to Syncro Corporation. Ignition adapter circuit. 3,874,354, Cl. 123-148.00E.

Crowe, Talmadge L., to Baker Oil Tools, Inc. Tubing hanger releasing and retrieving tool. 3,874,446, Cl. 166-129.000.

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Crower, Harry Bruce, to Crower Cams and Equipment Company. Engine conversion system. 3,874,358, Cl. 123-198.00F.

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CTEC Corporation: *See—*
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Cumberland Packing Corporation: *See—*
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Eisenstadt, Marvin E., 3,875,312.

Cummins, Oliver Frank. Dredger with adjustable endless digger and rotary mud slinger. 3,874,101, Cl. 37-69.000.

Cuniberti, Mario, to Owens-Illinois, Inc. Apparatus for self-controlling gaseous bubbler system in a glass melting furnace. 3,874,865, Cl. 65-161.000.

Cunningham, Sinclair Upton; Wells, James Rutherford; and Firth, Donald, to National Research Development Corporation. Cam follower piston. 3,874,275, Cl. 92-248.000.

Cunningham, William W.: *See—*
Anderson, Paul E.; Cunningham, William W.; and Kortz, George B., 3,874,736.

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Curtiss-Wright Corporation: *See—*
Pratt, Winthrop B., 3,874,829.

Cuscurida, Michael: *See—*
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Cutchaw, John M. Integrated circuit connector. 3,874,768, Cl. 339-17.0CF.

Cutler, Earl F., to Cutler Repaving Associates, Incorporated. Exhaust manifold for asphalt concrete heating apparatus. 3,874,366, Cl. 126-271.20A.

Cutler, Hymie. Path generating apparatus and method particularly for generating a two-lobed epitrochoid contour. 3,875,382, Cl. 235-151.110.

Cutler Repaving Associates, Incorporated: *See—*
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D-Tex Electronics: *See—*
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Dahl, Einar S., to Outboard Marine Corporation. Grass catcher unit for rotary lawnmowers. 3,874,152, Cl. 56-202.000.

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Dahlqvist, Jan; Matsson, Bo; and Johansson, Benny, to AGA Aktiebolag. Device for controlling the scanning in an infra-red imaging system. 3,875,330, Cl. 178-7.100.

Dai Nippon Toryo Co., Ltd.: *See—*
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Daiichi Seiyaku Co., Ltd.: *See—*
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Daimler-Benz Aktiengesellschaft: *See—*
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Dallen, John A., to Standard Products Company, The. Reglet joint. 3,874,142, Cl. 52-656.000.

Dalmatov, Vsevolod Yakolevich; Kim, Inna Pavlovna; Voronkova, Tamara Georgievna; and Moschansky, Nikolai Alexeevich. Acid-resisting material. 3,874,887, Cl. 106-84.000.

Dalson, Milton H.; Pfefferle, William C.; and Gallagher, James P., to Atlantic Richfield Company, by said James P. Gallagher; and Engelhard Minerals & Chemicals Corporation, by said Milton H. Dalson and William C. Pfefferle. Platinum-rhenium serial reforming in four beds. 3,875,047, Cl. 208-65.000.

Dalton, Robert J., deceased (by Dalton, Ruth C., executrix); Pfleger, Frederick W.; and Steel, John Y., to Arthur H. Thomas, Company. Knife sharpener, particularly for a microtome. 3,874,120, Cl. 51-59.00R.

Dalton, Ruth C., executrix: *See—*
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Dart, Edward Charles; Perry, Antony Robert; and Nemcek, Josef, to Imperial Chemical Industries Limited. Photocurable resin impregnated fabric for forming rigid orthopaedic devices and method. 3,874,376, Cl. 128-90.000.

Daugherty, Phillip M.; Palmer, Thomas E.; and Tidd, Wilmot D., to Scripto, Inc. Erasable writing medium suitable for use in ball point pens. 3,875,105, Cl. 260-33.20R.

Davey, Joseph A. Swimming gloves. 3,874,014, Cl. 9-308.000.

Davidson, Kenneth L. Apparatus for endotracheal and esophageal intubation. 3,874,377, Cl. 128-145.500.

Davies, Elmer S. Aseptic canning method. 3,875,318, Cl. 426-397.000.

Davies, William D. T.: *See—*
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Davis, Guy E., to Westinghouse Electric Corporation. Protection system for transferring turbine and steam generator operation to a backup mode especially adapted for multiple computer electric power plant control systems. 3,875,384, Cl. 235-151.210.

Davis, Paul D., Jr.; Holmes, Jerry D.; and Moore, Samuel D., to Texas Instruments Incorporated. Long range marine navigation system. 3,875,571, Cl. 343-6.50R.

Davis, Ralph A., to Dow Chemical Co., The. Recovery of bromine from organic bromides. 3,875,293, Cl. 423-481.000.

Davis, Robert Carlton: *See—*
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Deane, Clifford T., to West Virginia High Bird Corp. Battery powered vehicle drive. 3,874,472, Cl. 180-65.00R.

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De Bliek, John A.: *See—*
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De Brunn, Albert W.; and Feist, Gregory R. Tobacco processing method. 3,874,392, Cl. 131-143.000.

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Deckert, Helmut; Heinke, Wolfgang; Jacob, Herbert; and Kirschner, Helmut, to Wacker-Chemitronic. Process for the production of haze-free semiconductor surfaces. 3,874,129, Cl. 51-283.000.

Decoulos, John J.; and Simpson, Eugene E., to Boston Machine Works Co. Rocker platform edge binder. 3,874,015, Cl. 12-24.500.

Deeg, Emil W.; Canterbury, Bradford; and Simpson, Arnold J., to American Optical Corporation. Multifocal lens blanks. 3,874,777, Cl. 351-168.000.

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Deindoerfer, Fred H.; and Brake, Jon M., to American Hospital Supply Corporation. Improved blood storage unit and method of storing blood. 3,874,384, Cl. 128-272.000.

Deininger, Rolf; and Wolf, Erich, to Hermes Sweeteners Ltd. Moisture-stabilized effervescent mixture. 3,875,073, Cl. 252-188.30R.

Del Mar Engineering Laboratories: *See—*
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DePass, Laddie A., to General Electric Company. Condenser apparatus. 3,875,268, Cl. 261-88.000.

Derieg, Michael Edward; Fryer, Rodney Ian; and Sternbach, Leo Henryk, to Hoffmann-La Roche Inc. 3-Acetyl-(1,2 -a)imidazo-1,4-benzodiazepines. 3,875,181, Cl. 260-309.700.

Derr, Chester B.; and Nysten, Bernhard P., to William Prym, Inc. Jaw member-die member assembly. 3,874,578, Cl. 227-144.000.

Descoins, Charles E.; and Henrick, Clive A., to Zoecon Corporation. 1-Cyclopropyl-trans-2-buten-1-ol. 3,875,243, Cl. 260-617.00R.

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d'Hervilly, Guy; Edel, William A.; Jacquemin, Jean; and Westdorp, W. Alfred, to International Business Machines Corporation. Method of gettering impurities in semiconductor devices introducing stress centers and devices resulting thereof. 3,874,936, Cl. 148-1.500.
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Dilley, Douglas M., to United States of America, Navy. Tracking phase detector for surface wave correlators. 3,875,517, Cl. 328-155.000.
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Durand, Daniel; and Mangin, Pierre, to Naphtachimie. Solid catalysts for use for the polymerization of olefins. 3,875,076, Cl. 252-429.00B.
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Dusek, Harold C., to Allis-Chalmers Corporation. Load tap changing mechanism having constant duty cycle. 3,875,354, Cl. 200-11.0TC.
Dykeman, Fred Edgar: *See—*
Chiappetta, Ferdinand; and Dykeman, Fred Edgar, 3,874,158.
Dynamics Corporation of America: *See—*
Cook, Lawrence E., 3,874,068.
Dynamit Nobel AG: *See—*
Ismail, Mohamed Roshdy; and Raalf, Hans, 3,875,110.
Dysthe, Sven Ivar. Ski toe binding. 3,874,684, Cl. 280-11.35B.
Dzus Fastener Co. Inc.: *See—*
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E. R. Squibb & Sons, Inc.: *See—*
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Eagle-Picher Industries, Inc.: *See—*
Watson, David G., 3,874,712.
Earnest, Ernest R., to Hydrogen Corporation, The. Vapor generator. 3,874,345, Cl. 122-250.00R.
Eastman Kodak Company: *See—*
Costa, Lorenzo F.; Van Allan, James A.; and Grum, Frank, 3,874,946.
Kertel, Stanley S., 3,874,948.
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Eccles, Edward Stuart; Waddicor, Andrew Hurlstone; Roberts, Eric; and McNamara, John, to Secretary of State for Defense in Her Britannic Majesty's Government of the United Kingdom of Great Britain & Northern Ireland, The. On-line computer control system. 3,875,390, Cl. 235-153.0AE.

Eckert, Hans-Werner: *See—*
Koppensteiner, Gunter; Eckert, Hans-Werner; and Wehle, Volker, 3,874,869.

Eckles, William E.: *See—*
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Ecodyne Corporation: *See—*
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Eddleman, Roy T.; Schmitz, Richard L.; and Sharbaugh, David A., to Biospectrum, Inc. Clamp for thin walled tubing. 3,874,042, Cl. 24-255.0SL.

Edel, William A.: *See—*
d'Hervilly, Guy; Edel, William A.; Jacquemin, Jean; and Westdorp, W. Alfred, 3,874,936.

Edison, Robert R.: *See—*
Grosboll, Martin P.; and Edison, Robert R., 3,875,055.

Education Engineering Associates: *See—*
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Edwards, Philip Neil, to Imperial Chemical Industries, Limited. Pyridine derivatives. 3,875,174, Cl. 260-294.80R.

Edwards, Philip Neil, to Imperial Chemical Industries Limited. Pyridine derivatives. 3,875,175, Cl. 260-295.00E.

Edwards, Scott M. Hook setting device. 3,874,106, Cl. 43-15.000.

Efdyn Corporation: *See—*
Gryglas, Bogdan R., 3,874,408.

Effenheim, Raymond H. Ski support and lock. 3,874,202, Cl. 70-58.000.

Egger, Richard L.: *See—*
Lowery, Patrick A.; and Egger, Richard L., 3,875,373.

Egli, Christian: *See—*
Schlunke, Hans-Peter; and Egli, Christian, 3,875,158.

Eicher, Theo; Muller, Friedemann; and Krebs, Klaus-Werner, to Bayer Aktiengesellschaft. Smokable products based on carbonized filler-containing cellulose films. 3,874,390, Cl. 131-2.000.

Eickmann, Karl. Radial piston machine. 3,874,271, Cl. 91-491.000.

Eigenmann, Ludwig. Signal reflector with convex reflectors secured to a transparent sphere. 3,874,784, Cl. 350-109.000.

Eimer, Klaus: *See—*
Treplin, Friedrich-Wilhelm; Eimer, Klaus; and Thal, Heinz, 3,875,063.

Eisele, Hermann: *See—*
Asler, Karl-Heinz; Bonin, Andre; Dubuisson, Georges; Juhe, Michel; Reichardi, Wolfgang; Fauser, Edwin; and Eisele, Hermann, 3,874,351.

Eisenstadt, Marvin E., to Cumberland Packing Corporation. Calorie-free dipeptide sweetening composition. 3,875,311, Cl. 426-212.000.

Eisenstadt, Marvin E., to Cumberland Packing Corporation. Dipeptide sweetener composition. 3,875,312, Cl. 426-212.000.

Elcalor AG, Fabrik fur Elektrothermische Apparate: *See—*
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Electric Motion Control Corporation International: *See—*
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Electron Physics Limited: *See—*
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Electronor Corporation: *See—*
Franks, Charles R.; Schenker, Barry A.; O'Leary, Kevin J.; and Kolb, James M., 3,875,043.

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Elks, Joseph; Phillipps, Gordon Hanley; Tulley, Alan; Stephenson, Leslie; and Hill, Margaret Elizabeth, to Glaxo Laboratories. 9α-Unsubstituted-11β-bromo-19-norsteroids. 3,875,148, Cl. 260-239.500.

Ellefson, Larry P.; and Dilling, M. Ray, to Interface Mechanisms, Inc. High speed impact printer. 3,874,288, Cl. 101-110.000.

Elleman, Daniel D.: *See—*
United States of America, National Aeronautics and Space Administration; Wang, Taylor G.; Saffren, Melvin M.; and Elleman, Daniel D., 3,875,435.

Eller, Robert: *See—*
Arons, Irving J.; Eller, Robert; and Merrill, Richard E., 3,875,088.

Ellis, James Morgan Hunter; Hepworth, Paul; and Jhawar, Pannalal Sohanlal, to Imperial Chemical Industries Ltd. 2-(1-Propenyl-5-norbornene separation from piperylene dimers by complexing with copper, silver, gold or mercury compound. 3,875,251, Cl. 260-666.0PY.

Ellis, Leonard C., to Virginia Chemicals Inc. Groundwood pulp bleaching with sodium hydrosulfite in the presence of benzene polycarboxylates. 3,874,993, Cl. 162-71.000.

Elser, Wilhelm: *See—*
Kurth, Hans-Joachim; Rauch, Hubert; Rossberg, Peter; and Elser, Wilhelm, 3,875,099.

Elves, John: *See—*
Lofts, Peter Frederick; Elves, John; and Brown, Peter, 3,874,913.

Emhart Corporation: *See—*
Iacovazzi, Michael A.; and Basile, Aldo, 3,874,866.

Endo, Junji: *See—*
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Endo, Satour: *See—*
Okubo, Kenji; Endo, Satour; and Oka, Shoji, 3,874,751.

Endou, Hirohide; Kitazume, Yoshiaki; Kawasaki, Jun; and Hatsukano, Yoshikazu, to Hitachi Ltd. Program address control system with address advance adder for read only memory. 3,875,565, Cl. 340-172.500.

Energy Conversion Devices, Inc.: *See—*
Helbers, Jan, 3,875,566.

Enfield, Stuart A.; and Gandi, Robert A., to Becton, Dickinson and Company. Manifold nebulizer system. 3,874,379, Cl. 128-194.000.

Engelhard Minerals & Chemicals Corporation: *See—*
Dalson, Milton H.; Pfefferle, William C.; and Gallagher, James P. (said Milton H. Dalson and William C. Pfefferle assors. to), 3,875,047.

English Electric Valve Company, Limited: *See—*
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Enthone Incorporated: *See—*
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Environetics, Inc.: *See—*
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Erdman, Robert J.: *See—*
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Erini, Pietro: *See—*
Ackermann, Jacob; Radici, Pierino; and Erini, Pietro, 3,875,117.

Ernst Beckert Nadelfabrik Commandit-Gesellschaft: *See—*
Mayer, Harald; and Berentzen, Hardo, 3,874,199.

Ernst, Horst; Olschewski, Armin; and Brandenstein, Manfred, to SKF Industrial Trading and Development Company B.V. Bearing for swivel hinges. 3,874,028, Cl. 16-136.000.

Ernst Leitz GmbH: *See—*
Kossel, Dierick, 3,874,800.

Esco Corporation: *See—*
Montgomery, Robert A.; and Greer, Donald J., 3,874,533.

Eskeli, Michael. Sealed single rotor turbine. 3,874,190, Cl. 62-401.000.

Esselborn, Reiner: *See—*
Bernhard, Horst; and Esselborn, Reiner, 3,874,890.

Ethyl Corp.: *See—*
Haefner, Albert J.; Glass, Joseph B.; and Burt, William E., 3,875,270.
Nelson, Gunner E., 3,875,249.

Eto, Yoshizumi: *See—*
Ishibashi, Shizuka; and Eto, Yoshizumi, 3,875,586.

Etzbach, Volker, to Linde Aktiengesellschaft. Process for a more efficient liquefaction of a low-boiling gaseous mixture by closely matching the refrigerant warming curve to the gaseous mixture cooling curve. 3,874,185, Cl. 62-40.000.

Eue, Ludwig: *See—*
Munz, Ferdinand; Hack, Helmuth; and Eue, Ludwig, 3,875,180.

Ex-Cell-O Corporation: *See—*
Miller, Robert L.; and Fisset, Louis M., 3,874,219.

Exxon Research and Engineering Company: *See—*
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F. Hoffman-La Roche & Co. Aktiengesellschaft: *See—*
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Fabrik fur Pat, Sicherheits-Roster G. W. Barth: *See—*
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Fadgen, Earl Joseph, Jr.; and Saubestre, Edward Basil, to Enthone Incorporated. Activator solutions, their preparation and use in electroless plating of surfaces. 3,874,897, Cl. 117-47.00R.

Fahrendorff, Curtis H.: *See—*
Pauly, Ronald R.; and Fahrendorff, Curtis H., 3,874,111.

Fail Safe Brake Corporation: *See—*
Fontaine, John G., 3,874,629.

Falcioni, Joseph George, to Boeing Company, The. High fatigue squeeze riveting process and apparatus therefor. 3,874,070, Cl. 29-526.000.

Falling, Kjell, to Tabo Industriugnar AB. Crematory oven. 3,874,310, Cl. 110-3.000.

Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning: *See—*
Brinkmann, Ludwig; and Herwig, Walter, 3,875,120.
Grobmann, Max; List, Karl-Hermann; and Uhrig, Heinz, 3,874,891.

Farnham, Wilfred L., Jr.: *See—*
Ballinger, Forrest H.; Farnham, Wilfred L., Jr.; and Heggestad, Robert E., 3,875,525.

Farnsworth, William J., to Altamil Corporation. Collapsible containers. 3,874,543, Cl. 217-48.000.

Farr, Glyn Phillip Reginald, to Girling Limited. Automatic adjusters for vehicle brakes. 3,874,483, Cl. 188-196.0BA.

Farr, James B., to Tecumseh Products Company. Power supply for refrigeration units. 3,875,483, Cl. 318-213.000.

Fastway Fasteners, Inc.: *See—*
Schuplin, Jerome T., 3,874,035.

Fatt, Irving, to University of California, The Regents of the. Lens tester. 3,874,228, Cl. 73-94.000.

Faulkner, Richard Dale, to RCA Corporation. Electron discharge device including an electron emissive electrode having an undulating cross-sectional contour. 3,875,441, Cl. 313-104.000.

Faure, Jean-Jacques, to L'Etat Francais Delegation Ministerielle pour l'Armement Direction Technique des Armements Terrestres. Omnidirectional roller assembly. 3,874,491, Cl. 193-35.0MD.

Faurot, William R.; and Bjornsen, Bjorn G. Impact sensing target. 3,874,664, Cl. 273-29.00A.

Fauser, Edwin: *See—*
Asler, Karl-Heinz; Bonin, Andre; Dubuisson, Georges; Juhe, Michel; Reichardi, Wolfgang; Fauser, Edwin; and Eisele, Hermann, 3,874,351.

Fauser, Hans, to Superpart AG. Open fireplace for living quarters or the like. 3,874,364, Cl. 126-121.000.

Fechtig, Bruno; Vischer, Ernst; Bickel, Hans; Bosshardt, Rolf, deceased; by Bosshardt-Schar, Ruth Elisabeth, legal representative; and Urech, Jakob, to Ciba-Geigy Corporation. Process for the manufacture of amino-compounds. 3,875,151, Cl. 260-243.00R.

Fedders Corporation: *See—*
Anderson, Thomas J., 3,874,187.

Fegel, Albert, to Irontite Products Co., Inc. Pressure tester for injector sleeve of diesel engine head. 3,874,225, Cl. 73-40.000.

Feichtinger, Hans: *See—*
Noeske, Heinz; and Feichtinger, Hans, 3,875,235.

Feigel, Harold J., to Neo-Dyne Industries, Inc. Apparatus for testing and emplacing flexible sealed packages. 3,874,144, Cl. 53-53.000.

Feind, Klaus: *See—*
Buschmann, Karl; Diewald, Josef; Feind, Klaus; Friebe, Juergen; and Jeck, Arnulf, 3,874,592.

Feist, Gregory R.: *See—*
De Brunn, Albert W.; and Feist, Gregory R., 3,874,392.

Feit, Peter Werner; and Neilsen, Ole Bent Tvaermose, to Lovens Kemiske Fabrik Producktionsaktieselskab. New sulfamyl-anthranilic acids. 3,875,150, Cl. 260-239.600.

Feldman, Albert; and Feldman, Robert. Modular building units. 3,874,134, Cl. 52-79.000.

Feldman, Martin Louis; Hagedorn, Donald William; and Gordon, John Edson, to American Cyanamid Company. Process for isolating R-salt and intermediate product. 3,875,216, Cl. 260-512.00C.

Feldman, Robert: *See—*
Feldman, Albert; and Feldman, Robert, 3,874,134.

Fenaughty, Ronald Raymond, to United Aircraft Corporation. Hingeless in-plane rotor blade design. 3,874,820, Cl. 416-226.000.

Fendrich, Charles Nelson, Jr., to AMP Incorporated. High voltage ripple reduction circuit. 3,875,539, Cl. 333-79.000.

Fenerty, Michael J.: *See—*
Mustoe, David L.; Selbie, Frederic D., III; and Fenerty, Michael J., 3,874,680.

Fengler, Harald: *See—*
Thieme, Hans; Hujer, Friedrich; and Fengler, Harald, 3,874,791.

Fentos, Sabine: *See—*
Scholtis, Walter; Wallisch, Hans; Stuber, Wolfgang; and Fentos, Sabine, 3,874,958.

Ferguson, Dennis. Novel navigational computer and map tracking drive. 3,875,405, Cl. 250-211.00R.

Ferguson, Howard A., to Russell, Burdsall & Ward, Inc. Method of making a powdered metal part having a bearing surface. 3,874,049, Cl. 29-149.5DP.

Ferguson, Stuart R. Waste conversion process. 3,875,317, Cl. 426-373.000.

Ferlin, William J., to Lincoln Brass Works, Inc. Gas burner. 3,874,841, Cl. 431-193.000.

Ferrin, Wayne W.: *See—*
McKinney, Lloyd J.; and Ferrin, Wayne W., 3,875,038.

Ferris, Donald L., to United Aircraft Corporation. Apparatus for folding blades without changing pitch due to folding. 3,874,817, Cl. 416-143.000.

Ferro Manufacturing Corporation: *See—*
Pickles, Joseph, 3,874,722.

Fiat Societe per Azioni: *See—*
Peruglia, Marco; Amedei, Giuseppe; Bertone, Antonino; and Dotti, Giulio, 3,874,745.

Fiber Industries, Inc.: *See—*
MacFarlane, Iain Mackay, 3,874,159.

Fibre Formations, Inc.: *See—*
Schroeder, Fred G., 3,874,831.

Figueroa, Ruben. Adjustable roller assembly and suspension means. 3,874,748, Cl. 308-6.00R.

Filepp, Leslie; Jones, James S.; and Allia, Charles, to Midland-Ross Corporation. Gear type torsion coupling with quickly replaceable sleeve. 3,874,194, Cl. 64-9.00R.

Filliman, Paul Dean: *See—*
Hilbert, Francis H.; and Filliman, Paul Dean, 3,875,334.

Finck, Hans-Werner, to Sandoz Ltd. Alkali metal alkyl sulphonate antistatic agent. 3,875,082, Cl. 252-518.000.

Finkbeiner, Herman L.; and Bush, John B., Jr. Anhydrides to improve oxidative coupling reactions. 3,875,224, Cl. 260-537.00R.

Finkelston, Raymond, Jr. Package with complementary body sheets. 3,874,556, Cl. 220-306.000.

Finney, Philip F., to Thermo-Couple Products Company, Inc. Surface thermocouple. 3,874,239, Cl. 73-349.000.

Firestone, Raymond A.: *See—*
Christensen, Burton G.; Firestone, Raymond A.; and Johnston, David B. R., 3,875,146.

Firkins, Robert Charles: *See—*
Young, John Wallace; Firkins, Robert Charles; Ring, Gregg; and Tatum, John A., Jr., 3,874,465.

First Dynamics, Inc.: *See—*
Chang, Henry M., 3,874,554.

Firth, Donald: *See—*
Cunningham, Sir.clair Upton; Wells, James Rutherford; and Firth, Donald, 3,874,275.

Fischer & Porter Co.: *See—*
Burgess, Thomas H., 3,874,234.

Fischer, Russell C., to GTE Automatic Electric Laboratories Incorporated. Self-balancing hybrid circuit. 3,875,350, Cl. 179-170.00D.

Fischer, Wayne L. Safety attachment for appliances subject to fluid leakage. 3,874,403, Cl. 137-386.000.

Fisset, Louis M.: *See—*
Miller, Robert L.; and Fisset, Louis M., 3,874,219.

Fitzner, Arthur O., to Brunswick Corporation. Ignition system for multiple cylinder internal combustion engines having automatic spark advance. 3,874,349, Cl. 123-117.00R.

Fleckenstein, Andrew J.; and Mitchell, Herman C. Timing motor drive mechanism for water softener valves. 3,874,412, Cl. 137-624.130.

Flege, John H. Pendulum golf putter. 3,874,668, Cl. 273-81.300.

Fleischer, Helmut; and Schnaibel, Eberhard, to Robert Bosch G.m.b.H. Brake antilock system with monitor circuitry. 3,874,743, Cl. 303-21.0AF.

Fleischer, Helmut: *See—*
Schnaibel, Eberhard; and Fleischer, Helmut, 3,874,741.

Fleming, Mills Lawrence: *See—*
Anderson, Charles Victor; Fleming, Mills Lawrence; Kotzias, George Anthony; Ross, Robert Rogers; and Williams, James Luchin, 3,875,325.

Fleming, Philip F., to Gehl Company. Chopping cylinder for forage harvesters or the like. 3,874,605, Cl. 241-292.000.

Floren Klopfenstein: *See—*
Williams, Don W., 3,875,560.

Florent, Jean: *See—*
Belloc, Andre; Florent, Jean; Lunel, Jean; Mancy, Denise; and Verrier, Jean, 3,875,005.
Belloc, Andre; Florent, Jean; Mancy, Denise; and Verrier, Jean, 3,875,006.
Mancy, Denise; Florent, Jean; and Preud'Homme, Jean, 3,875,010.

Florio, Anthony, to Raymond Lee Organization Inc., The, a part interest. Flotation device for a craft. 3,874,012, Cl. 9-9.000.

Florjancic, Dusan: *See—*
Honold, Ernst; Matthias, Heinz-Bernd; and Florjancic, Dusan, 3,874,813.

Flowers, Arthur M. One-man adjustable bench press rack. 3,874,658, Cl. 272-58.000.

Flygstad, Dean W., to Telex Communications, Inc. Tape drive. 3,874,614, Cl. 242-209.000.

Flynn, Charles J., to Anthony Manufacturing Corporation. Apparatus and method for improving water distribution from rotary sprinklers. 3,874,588, Cl. 239-11.000.

FMC Corporation: *See—*
Bennington, Robert L.; and Massengale, John T., 3,875,164.
Boeck, David J., 3,874,150.
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Knopka, William N., 3,874,157.
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Lee, Arthur L.; and Coval, Arthur B., 3,874,698.
Leigh, Theodore M., 3,874,515.
Raque, Robert G., 3,874,078.
Vadas, Leslie, 3,874,280.
Volpp, Gert Paul; and Dounchis, Harry, 3,874,873.

FMI-Mecfond-Aziende Mecchaniche Riunite S.p.A.: *See—*
Maiorino, Giuseppe, 3,874,209.

Focke, Heinz. Testing devices for cigarette packing machines. 3,874,227, Cl. 73-94.000.

Foley, Terence Patrick Grattan. Forecasting apparatus. 3,874,584, Cl. 234-128.000.

Folk, Kenneth Foster, to AMP Incorported. Method and apparatus for centering and shearing the free end portion of a plurality of leads which extend outwardly from one end of a template. 3,874,077, Cl. 29-628.000.

Fonagy, Dezso. Carburetor for an internal combustion engine. 3,875,266, Cl. 261-50.00A.

Fontaine, John G., to Fail Safe Brake Corporation. Fluid operated needle valve. 3,874,629, Cl. 251-61.400.

Fontanella, Bartolomea: *See—*
Ariano, Rosalba; and Fontanella, Bartolomea, 3,874,669.

Foote, Francis C.; and Carper, Robert L., to Addressograph-Multigraph Corporation. Information-carrying article and reading apparatus and method. 3,874,586, Cl. 235-61.11D.

Foraker, John C.: *See—*
Wegley, Jack H.; and Foraker, John C., 3,874,512.

Forchini, James F.; and Machado, Mark A., to Ecodyne Corporation. Cooling tower distribution box. 3,875,269, Cl. 261-111.000.

Ford Motor Company: *See—*
Jordan, James A., 3,874,731.

Ford, Roger S., to Hoover Company, The. Hose coupling arrangement for pneumatically actuated floor care appliances. 3,874,024, Cl. 15-339.000.

Foreitas Engine Company, The: *See—*
Frietas, Daniel A., 3,874,346.

Foresight Enterprises, Inc.: *See—*
Thompson, Darrell T., 3,875,032.
Forget, Ronald D.: *See—*
Renn, Donald W.; and Forget, Ronald D., 3,875,044.
Forgione, Peter Salvatore, to American Cyanamid Company. Glutamic oxaloacetic transaminase test material. 3,875,014, Cl. 195-103.50R.
Forgo, Gabor; Meyer, Erwin; and Moser, Karl, to Zellweger AG. Process for electrostatic printing, products produced by such process, and use of these products. 3,875,320, Cl. 427-19.000.
Formac International, Inc.: *See—*
Raven, James R.; and Langford, Frederic E., 3,874,517.
Formica, Vincent A.; Torok, Steve F.; and Caro, Jasper, to United States of America, Navy. Directional detection system. 3,875,553, Cl. 340-16.00R.
Forsvarets Forskingsinstitutt: *See—*
Hedemark, Rolf, 3,874,296.
Fossett, Wallace L.; Waddell, Jerry D.; and Akester, Roger L., to ACF Industries, Incorporated. Railway hopper butterfly valve actuating mechanism. 3,874,569, Cl. 222-508.000.
Foster, Edward P.; Kelly, Robert J.; and Sage, Warnie L., to Babcock & Wilcox Company, The. Sewage disposal system. 3,875,357, Cl. 210-59.000.
Fotis, Peter: *See—*
Boone, David E.; and Fotis, Peter, 3,875,075.
Fouche, Jean Clement Louis: *See—*
Blondel, Jean-Claude Rene Georges; Fouche, Jean Clement Louis; and Gueremy, Claude Georges Alexandre, 3,875,156.
Fox, Austin L.; and Jones, William A. A., to Molins Limited. Box or packet. 3,874,581, Cl. 229-44.0CB.
Fox, Richard; and Hay, David Gilbert, to ICI Australia Limited. Compositions of matter and processes. 3,875,135, Cl. 260-97.000.
Fraley, Richard W., to PPG Industries, Inc. Herbicidal compositions containing cycloalkyl carbamates as soil life extenders. 3,874,939, Cl. 71-111.000.
Franckowiak, Sigismond: *See—*
Barthel, Yves; Franckowiak, Sigismond; and Renault, Philippe, 3,875,295.
Franklin, Mark E.; and Schmidt, James R. Dental pin and dispenser. 3,874,081, Cl. 32-15.000.
Franks, Charles R.; Schenker, Barry A.; O'Leary, Kevin J.; and Kolb, James M., to Electronor Corporation. Electrodes with multicomponent coatings. 3,875,043, Cl. 204-290.00F.
Franz, Arvel O.; and Gray, John Lawrence. Slurry unloading of bulk alkaline earth metal carbonates. 3,874,642, Cl. 259-147.000.
Franz, Milan: *See—*
Matusek, Miroslav; Franz, Milan; and Rousar, Ivo, 3,875,039.
Fratar, Francis J.: *See—*
Gostyn, Ernest; and Fratar, Francis J., 3,875,543.
Frederick D. Toye: *See—*
Scuitto, Thomas John; and Kramer, David Chester, 3,875,375.
Frederick N. Toye: *See—*
Scuitto, Thomas John; and Kramer, David Chester, 3,875,375.
Fredriksson, John I.; and Coes, Samuel H., to Norton Company. Silicon carbide resistance igniter. 3,875,477, Cl. 317-98.000.
Freeman, Jonathan P.: *See—*
Pao, Yoh-han; Freeman, Jonathan P.; and Allen, John W., 3,875,400.
French, Marcus: *See—*
Buff, Fred; French, Marcus; and Pollock, Warren, 3,874,988.
Friebe, Juergen: *See—*
Buschmann, Karl; Diewald, Josef; Feind, Klaus; Friebe, Juergen; and Jeck, Arnulf, 3,874,592.
Frieberg, Robert J.: *See—*
Buczek, Carl J.; Chenausky, Peter P.; Frieberg, Robert J.; and Wayne, Robert J., 3,875,531.
Fried, David L.: *See—*
Isaacs, David; Fried, David L.; and Ameer, George A., 3,874,799.
Friedlander, Charles B.: *See—*
Prucnal, Paul J.; and Friedlander, Charles B., 3,874,906.
Friedman, Robert H., to Getty Oil Company. Recovery of viscous acidic crude oils. 3,874,453, Cl. 166-270.000.
Friedman, Sander B.; and Martin, Hugh R. Liquid fluidic device. 3,874,416, Cl. 137-836.000.
Frietas, Daniel A., to Foreitas Engine Company, The. Internal combustion engine. 3,874,346, Cl. 123-18.00R.
Frink, Russell E.; and Milianowicz, Stanislaw A., to Westinghouse Electric Corporation. Disconnect switch. 3,875,355, Cl. 200-48.00A.
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Fukumoto, Takaharu. Printed paper drying device for offset printing. 3,874,091, Cl. 34-66.000.
Fukushima, Noriyasu, to Daiwa Seiko Incorporated. Fishing reels. 3,874,615, Cl. 242-219.000.
Fulford, Emory Eugene, to New Jersey Zinc Co., The. Core tube placement and retrieval. 3,874,466, Cl. 175-236.000.
Fulton Industries, Inc.: *See—*
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Ghirga, Marcello; and Buzzi, Gian Fausto, to Societa' Italiana Resine S.I.R. S.p.A. Process for the production of acrylonitrile. 3,875,204, Cl. 260-465.300.

Giacino, Christopher: *See—*
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Gibson, John James; and Schwarz, Hans George, to RCA Corporation. Apparatus and method for measuring the signal to noise ratio for a periodic signal. 3,875,328, Cl. 178-6.000.

Gibson, Leonard: *See—*
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Gibson, William H. Moisture responsive apparatus for controlling moisture content of soil. 3,874,590, Cl. 239-63.000.

Gilbert, Jack J. Automatic electrometric analysis. 3,875,022, Cl. 204-1.00T.

Gilliom, John W., to Tappan Company, The. Control circuit for a self-cleaning oven. 3,875,372, Cl. 219-413.000.

Gilmore, Earl A.; and Merklen, Kenneth E., to Gulf & Western Industries, Inc. Connector cover. 3,874,765, Cl. 339-103.00M.

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Glowacki, John J. Hypodermic needle with distortable hub liner. 3,874,383, Cl. 128-221.000.

Golay, Charles R. Remote fill system for L-P gas cylinder. 3,874,428, Cl. 141-95.000.

Gold, Elijah H., to Schering Corporation. Substituted Carboxanilides. 3,875,229, Cl. 260-562.00R.

Goldberg, Joshua I., to Boeing Company, The. Data collection system and apparatus suitable for use therein. 3,875,505, Cl. 324-94.000.

Golembeski, Ronald J., to United States Steel Corporation. Aluminum powder as an esterification catalyst. 3,875,210, Cl. 260-475.00R.

Gollnick, Cyril R., to Leach Company. Refuse loading apparatus. 3,874,529, Cl. 214-83.300.

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Goyarts, Wynand M. J. M., to Clark Equipment Company. Extensible load lifting frame. 3,874,719, Cl. 294-81.0SF.

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Grand, Paul Sheldon, to Colgate-Palmolive Company. Antimicrobial detergent composition containing aminopolyureylene resin. 3,875,071, Cl. 252-106.000.

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Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., to Mill Master Onyx Corporation. Microbiocidal polymeric quarternary ammonium compounds. 3,874,870, Cl. 71-67.000.

Greene, Clarence Kirk. Geothermal heat exchange method and apparatus. 3,874,174, Cl. 60-641.000.

Greene, Clarence Kirk. Pressure-responsive displacement changer for vehicular drive system having a variable displacement pump. 3,874,470, Cl. 180-14.00A.

Greene, Kenneth E. Brochure filing system. 3,874,756, Cl. 312-234.000.

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Grobmann, Max; List, Karl-Hermann; and Uhrig, Heinz, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning. Dispersing agents for the fine distribution and stabilisation of dyes. 3,874,891, Cl. 106-308.00S.

Groce, William H. Cooking unit. 3,874,278, Cl. 99-421.00H.

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Gruen, Harold; Divita, Philip S.; and Werneth, Charles J., to I. I. Communications, Inc. Variable bandwidth voice and data telephone communication system. 3,875,339, Cl. 179-15.0FD.

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Gutzwiller, Juerg Albert Walter; and Uskokovic, Milan Radoje, to Hoffman-La Roche, Inc. Trans-4-piperidine acetic acids and esters and racemic cis-4-piperidine acetic acids and esters. 3,875,171, Cl. 260-293.770.

Guzman, Carlos Vilches: *See—*
Vera, Carlos Molina; Guzman, Carlos Vilches; and Soto-Krebs, Luis, 3,874,940.

Gyugyi, Laszlo, to Westinghouse Electric Corporation. Static power conversion arrangement for converting direct current power to alternating current power. 3,875,494, Cl. 321-27.00R.

H. E. Wiese, Inc.: *See—*
Gresens, Glenn F., 3,874,708.

Haag, Werner O.; and Miale, Joseph N., to Mobil Oil Corporation. Oxidative dehydrogenation of organic compounds. 3,875,252, Cl. 260-669.00R.

Haas, Werner E. L.; and Adams, James E., to Xerox Corporation. Electrostatic imaging system with magnetic toner. 3,875,576, Cl. 346-74.0ES.

Habermeier, Jurgen; and Porret, Daniel, to Ciba-Geigy Corporation. Glycidylurethane compounds, processes for their manufacture and their use. 3,875,190, Cl. 260-348.00A.

Hack, Helmuth: *See—*
Munz, Ferdinand; Hack, Helmuth; and Eue, Ludwig, 3,875,180.

Hady, William F.: *See—*
Ludwig, Lawrence P.; and Hady, William F., 3,874,677.

Haefner, Albert J.; Glass, Joseph B.; and Burt, William E., to Ethyl Corp. Process of preparing battery separators. 3,875,270, Cl. 264-6.000.

Haerter, Manfred: *See—*
Bayer, Gerhard; Cherdron, Egon; Haerter, Manfred; and Hecht, Ernst, 3,875,274.

Haga, Hisashi; and Takamatsu, Yukio, to Toyo Rubber Industry Company Ltd. Method for continuously producing a synthetic polymer foamed mass having square cross section. 3,875,276, Cl. 264-51.000.

Hagedorn, Donald William: *See—*
Feldman, Martin Louis; Hagedorn, Donald William; and Gordon, John Edson, 3,875,216.

Hahn, Robert S.; St. Andre, Arthur F.; and Robillard, Edward G., to Cincinnati Milacron-Heald Corp. Apparatus for machining surface of revolution having discontinuities. 3,874,809, Cl. 408-3.000.

Haines, Paul Gordon: *See—*
Albert, Harry Elmer; and Haines, Paul Gordon, 3,875,234.

Hale, H. Jackson, to Remington Arms Company, Inc. Plastic cartridge case for high pressure center fire ammunition having multi-component stamped metal head. 3,874,294, Cl. 102-44.000.

Hall, Lawrence H., to United States of America, Atomic Energy Commission. Programmed-sweep unit for expanding the capabilities of a computer of average transients. 3,875,385, Cl. 235-151.350.

Hall, Percy P. Hitch for trailers overhanging a truck bed or car body. 3,874,702, Cl. 280-423.00R.

Halwas, Larry E.: *See—*
Hisey, Robert W.; and Halwas, Larry E., 3,874,196.

Hamby, Charles H., to Deering Milliken Research Corp. Process for simultaneously edge-crimping and false-twisting yarn and yarn produced thereby. 3,874,156, Cl. 57-140.00R.

Hamil, Henry F.: *See—*
Adams, Leon M.; and Hamil, Henry F., 3,875,034.

Hamill, Thomas E., to Coulter Diagnostics, Inc. Reagent and method for determining leukocytes and hemoglobin in the blood. 3,874,852, Cl. 23-230.00B.

Hamura, Terasu: *See—*
Matsuzaki, Akira; and Hamura, Terasu, 3,874,960.

Han, Shu Tang: *See—*
Parker, Joseph D., deceased; Han, Shu Tang; and Hergert, Richard E., 3,874,509.

Hanagarth, Wolfgang, to Klein, Schanzlin & Becker Aktiengesellschaft. Axial pressure balancing arrangement for a multistage centrifugal pump. 3,874,812, Cl. 415-106.000.

Hannon, Donald F., to Laminex, Inc. Identification card preform and laminating system utilizing same. 3,874,979, Cl. 161-6.000.

Hansel, Gernot: *See—*
Schmid, Wolfgang; Bleicher, Manfred; Hansel, Gernot; and Wanner, Karl, 3,874,460.

Hansen, Robert N.; Hempel, George T.; and Noesges, Raymond. Support brace for walls and the like. 3,874,625, Cl. 248-354.00S.

Hanzel, Louis R.: *See—*
Fruscella, Frederick A.; and Hanzel, Louis R., 3,874,573.

Happel, Fritz. Milking cup. 3,874,338, Cl. 119-14.530.

Hara, Hiroshi; and Onishi, Kazuo, to Hitachi, Ltd. Variable reluctance type step motor. 3,875,437, Cl. 310-49.000.

Hara, Koichi: *See—*
Sema, Katsutosh; Wakao, Mitsuru; Kobayashi, Yoshinori; and Hara, Koichi, 3,874,305.

Harada, Mitsumasa: *See—*
Muto, Kiyoshi; Yamamoto, Yasuhisa; Toyoda, Yoshinori; Azemi, Shozo; Okano, Shigeru; Masuyama, Kenya; Aihara, Seitaro; Ito, Takao; Ogawa, Isamu; and Harada, Mitsumasa, 3,874,062.

Harazim, Alfons: *See—*
Kral, Jan; Kerlin, Kurt; Gratza, Heldemar; and Harazim, Alfons, 3,874,245.

Harden, John Charles; Knupp, John Lawrence, Jr.; and Mastrangelo, Sebastian Vito Rocco, to du Pont de Nemours, E. I., and Company. Pressure-sensitive sensor/logic assembly. 3,875,434, Cl. 307-308.000.

Hardison, Jack E., to Atlantic Richfield Company. Geothermal exploration. 3,874,232, Cl. 73-154.000.

Hardtmann, Goetz E. Quaternary-tricyclic quinazolinones. 3,875,160, Cl. 260-256.40F.

Hardtmann, Goetz E., to Sandoz-Wander, Inc. Imidazo(2,1-b)quinazolin-5(1OH)-ones. 3,875,161, Cl. 260-256.40F.

Harkness, Joseph R., to Briggs & Stratton Corporation. Alternator electrical system for battery charging and load energization. 3,874,551, Cl. 320-39.000.

Harland, Philip W.; and Waite, Ralph D., to Ametek, Inc. Liquid-filled pressure gauge. 3,874,241, Cl. 73-416.000.

Harmon, Emerson R., to Amolga Corporation, The. Pressure vessel with liner. 3,874,544, Cl. 220-3.000.

Harmon Industries, Inc.: *See—*
Ballinger, Forrest H.; Farnham, Wilfred L., Jr.; and Heggestad, Robert E., 3,875,525.

Harms, A. D., Jr., to E-Systems, Inc. Electro-optical reader. 3,875,419, Cl. 250-568.000.

Harms, Horst; and Lucht, Wilhelm, to Aktiengesellschaft "Weser". Device for taking core samples from ocean and other submarine floors. 3,874,462, Cl. 175-5.000.

Harper, Ernest A.; and Reber, Martin R., to Phillips Petroleum Company. Removing nitrogen from and subsequently liquefying natural gas stream. 3,874,184, Cl. 62-28.000.

Harper, Judson M.: *See—*
Seckler, David W.; and Harper, Judson M., 3,875,319.

Harrington, Charles M., to CHM Enterprises, Inc. Batting tee. 3,874,662, Cl. 273-26.00E.

Harris, George J.; and Naylor, Thomas K., to American Optical Corporation. Electrocardiographic waveform analyzer. 3,874,370, Cl. 128-2.06A.

Harris-Intertype: *See—*
Bryson, Robert A.; Steckel, Douglas T.; Moser, James R.; and Silva, Robert M., 3,874,649.

Harris-Intertype Corporation: *See—*
Rana, Victoriano Fernandez, 3,874,522.
Richardson, Robert Harold; Smith, William Merdoc; and Davis, Robert Carlton, 3,875,461.

Harte, Ralph James: *See—*
Williams, John Llewellyn; and Harte, Ralph James, 3,875,484.

Hartigan, Edward G.: *See—*
Patience, Donald; Swallow, Roger T.; Hartigan, Edward G.; and Knohl, Herbert, 3,874,001.

Harvey, Walter W.; Randlett, Myron R.; and Bangerskis, Karlis I., to Kennecott Copper Corporation. Apparatus for the electrolytic recovery of metal employing improved electrolyte convection. 3,875,041, Cl. 204-273.000.

Harzer, Peter; and Hoffman, Gunther, to Wandel u. Goltermann. Phase-stable decadically adjustable frequency synthesizer. 3,875,524, Cl. 331-1.00A.

Hasbro Industries, Inc.: *See—*
Arons, Irving J.; Eller, Robert; and Merrill, Richard E., 3,875,088.

Hascoe, Norman. Hermetic sealing cover for a container for a semiconductor device. 3,874,549, Cl. 220-200.000.

Hasenbalg, Ralph D., to Vector General, Inc. Vector tablet digitizing system. 3,875,331, Cl. 178-19.000.

Hashida, Taizo; Miyoshi, Shoji; Fujishima, Hiroyasu; and Okumura, Masaru, to Toyo Rubber Industry Co., Ltd. Radial-ply tire with steel and textile breaker. 3,874,436, Cl. 152-361.0DM.

Hashino, Yasuo: *See—*
Yoshino, Masatsugu; Hashino, Yasuo; and Morishita, Masataka, 3,875,008.

Hasino, Ko: *See—*
Kawashima, Tetsuya, 3,874,565.

Haskell, Philip R.: *See—*
Catlin, Robert T.; Dawson, Chester H.; and Haskell, Philip R., 3,874,126.

Hassan, Javathu K.; Mack, Alfred; and Wojtaszek, Michael R., to International Business Machines Corporation. Method and apparatus for handling workpieces. 3,874,525, Cl. 214-17.00B.

Hasspacher, Klaus: *See—*
Bastian, Jean-Michel; and Hasspacher, Klaus, 3,875,233.

Hatley, Kenneth John, to Butterworth System Inc. Tank cleaning machine with selective wash programming. 3,874,594, Cl. 239-227.000.

Hatsukano, Yoshikazu: *See—*
Endou, Hirohide; Kitazume, Yoshiaki; Kawasaki, Jun; and Hatsukano, Yoshikazu, 3,875,565.
Tsuiki, Takao; and Hatsukano, Yoshikazu, 3,875,386.

Hatt, Brian William: *See—*
Barker, Sidney Alan; Somers, Peter John; and Hatt, Brian William, 3,875,140.

Haug, Werner: *See—*
Baitinger, Otz; and Haug, Werner, 3,875,426.

Hauni-Werke Korber & Co. KG: *See—*
Dogl, Ernst; Funck, Albrecht; Wellach, Dieter; and Winkler, Hans-Georg, 3,874,391.

Haupt, Eberhard: *See—*
Altmann, Dieter; and Haupt, Eberhard, 3,874,910.

Haupt, Wilhelm: *See—*
Altmann, Dieter; and Haupt, Eberhard, 3,874,910.

Hauser, Hans; and Jones, Ronald N., to J. B. Foote Foundry Co., The. Shift mechanism for transmissions. 3,874,248, Cl. 74-475.000.

Haven, Roger Lindsy, to United States of America, Army. Technique to PCM high power lasers. 3,875,534, Cl. 332-7.510.

Havens, Carl B., to Dow Chemical Company, The. Irrigation tube. 3,874,598, Cl. 239-542.000.

Havlice, James F.: *See—*
Quate, Calvin F.; Havlice, James F.; and Kino, Gordon S., 3,875,550.

Hawthorn, J. D.: *See—*
Bonuchi, James A.; and Hawthorn, J. D., 3,874,186.

Hay, David Gilbert: *See—*
Fox, Richard; and Hay, David Gilbert, 3,875,135.

Hay, Robert A., II.; and De Bliek, John A., to Dow Chemical Company, The. Laminate construction. 3,874,983, Cl. 161-102.000.

Hayakawa, Shigeru: *See—*
Wasa, Kiyotaka; Hosomi, Fumio; and Hayakawa, Shigeru, 3,875,442.

Hayakawa, Yoshihide; and Satomura, Masato, to Fuji Photo Film Co., Ltd. Process for the production of polymer images. 3,874,947, Cl. 96-51.000.

Hayashi, Chihiro, to Sumitomo Metal Industries Limited. Method of controlling the wall thickness within a tube elongater by utilizing a screw-down control. 3,874,211, Cl. 72-208.000.

Hayashi, Eiji, to Yokogawa Electric Works, Ltd. Pulse width modulation type resistance deviation measuring apparatus. 3,875,501, Cl. 324-62.000.

Hayashi, Eiji, to Yokogawa Electric Works, Ltd. Dual slope type resistance deviation measuring apparatus. 3,875,503, Cl. 324-62.000.

Hayashi, Junichi; and Kobayashi, Tadaki, to Toyo Kogyo Co., Ltd. Apparatus for producing a corrugated leaf spring. 3,874,210, Cl. 72-168.000.

Hayashi, Motoshige; Kukumura, Mikio; and Sano, Zengo, to Sekisui Kaseihin Kogyo Kabushiki Kaisha. Resin sheet having an appearance of carpet or velvet and process therefor. 3,874,981, Cl. 161-62.000.

Hayashi, Takao; and Kato, Hajime, to Fuji Photo Film Co., Ltd. Recording sheet. 3,874,895, Cl. 117-36.800.

Hayashi, Yutaka; and Tarui, Yasuo. Method for gain control of field-effect transistor. 3,875,536, Cl. 332-31.00T.

Hayashibara Biochemical Laboratories, Incorporated: *See—*
Kato, Koso; and Shiosaka, Makota, 3,875,308.

Hayes, Philip; and O'Leary, William, to Artiloc U.S.A. Inc. Devices for inhibiting the jack-knifing or articulated vehicles. 3,874,699, Cl. 280-432.000.

Hayne, Thomas F., to Xerox Corporation. Corona generator cleaning apparatus. 3,875,407, Cl. 250-324.000.

Haynos, Joseph Gabrial, to Communications Satellite Corporation (Comsat). Solar cell array. 3,874,931, Cl. 136-89.000.

Hazard, Robert E., to Polytop Corporation. Dispensing closure with pump parts and container using the same. 3,874,562, Cl. 222-209.000.

Hazard, Robert E.: *See—*
La Vange, Donald H.; and Hazard, Robert E., 3,874,568.

Hazen, Thamon E., to Iowa State University Research Foundation, Inc. Dowing syphon. 3,874,402, Cl. 137-137.000.

Heath, Darrell R.; and Wirth, Joseph G., to General Electric Company. Polyetherimides. 3,875,116, Cl. 260-47.0CP.

Hecht, Ernst: *See—*
Bayer, Gerhard; Cherdron, Egon; Haerter, Manfred; and Hecht, Ernst, 3,875,274.

Heckl, Egon; Jungkind, Roland; and Payrhammer, Bernd. Apparatus for demonstrating the mode of operation of safety ski bindings mounted on skis or wood specimens. 3,874,099, Cl. 35-49.000.

Hedemark, Rolf, to A/S Kongsberg Vapenfabrikk; and Forsvarets Forskingsinstitutt. Proximity fuse. 3,874,296, Cl. 102-70.20P.

Hedstrom, Ture E. Method and arrangement for shoring up the base frame of lifts hoists and the like. 3,874,477, Cl. 182-141.000.

Heffe, Wilhelm, to Sandoz-Wander Inc. Cyanoalkyl substituted-3-oxo-alkamidines. 3,875,205, Cl. 260-465.50R.

Heffler, Joachim: *See—*
Pohl, Franz A.; Bohm, Harald; and Heffler, Joachim, 3,874,930.

Heftman, Alan: *See—*
O'Reilly, Edward M.; Heftman, Alan; and Hoff, Lewis C., 3,874,291.

Hegg, Thomas R.; and McCormack, Michael D., to Interstate Industries, Inc. Anti-tilt lock mechanism. 3,874,755, Cl. 312-221.000.

Heggestad, Robert E.: *See—*
Ballinger, Forrest H.; Farnham, Wilfred L., Jr.; and Heggestad, Robert E., 3,875,525.

Heidingsfeld, Viktor; Hudecek, Slavko; Hnidek, Jaroslav; Kolarik, Jan; and Zelinger, Jiri, to Ceskoslovenska akademie ved. Method for producing thin-walled articles from plastics. 3,875,261, Cl. 260-899.000.

Heim, John V.; and Heim, Kenneth R. Call switch bracket for handicapped. 3,875,356, Cl. 200-52.00R.

Heim, Kenneth R.: *See—*
Heim, John V.; and Heim, Kenneth R., 3,875,356.

Hein, Hilmar; Janzon, Karlheinz; Weigert, Wolfgang; Liedtke, Christa; and Muller, Rudolf, to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler. Process for the production of tetrabromophthalic anhydride. 3,875,186, Cl. 260-346.300.

Heinke, Wolfgang: *See—*
Deckert, Helmut; Heinke, Wolfgang; Jacob, Herbert; and Kirschner, Helmut, 3,874,129.

Heinrich Kuper, Firma: *See—*
Biewald, Heinz, 3,875,368.

Heinrich Zangenberg GmbH & Co.: *See—*
Oberhaus, Wilhelm, 3,874,397.

Heinz Behrens: *See—*
Behrens, Heinz; Schneider, Paul; and Zapf, Ernst, 3,874,844.

Heise, Victor. Pannier for cycles. 3,874,574, Cl. 224-31.000.

Helbers, Jan, to Energy Conversion Devices, Inc. Resetting filament-forming memory semiconductor devices with multiple reset pulses. 3,875,566, Cl. 340-173.00R.

Hellberg, Karl-Heinz; and Massonne, Joachim, to Kali-Chemie Aktiengesellschaft. Process for making cryolite. 3,875,291, Cl. 423-465.000.

Helmrich, Guenter: *See—*
Granderath, Josef; and Helmrich, Guenter, 3,874,838.

Hemdal, Goran Anders Henrik, to Telefonaktiebolaget L M Ericsson. Electronic selector having a number of inlet and an equal number of outlets for exchange of analog or digital signals. 3,875,562, Cl. 340-166.000.

Hempel, George T.: *See—*
Hansen, Robert N.; Hempel, George T.; and Noesges, Raymond, 3,874,625.

Hendel & Cie GmbH: *See—*
Koppensteiner, Gunter; Eckert, Hans-Werner; and Wehle, Volker, 3,874,869.

Hendrickson, Richard E. Lightweight portable ice fishing shelter frame. 3,874,398, Cl. 135-4.00R.

Henkel & Cie GmbH: *See—*
Sy, Max-Heinz; and Holdt, Bernd-Dieter, 3,874,871.

Hennenberger, Karl-Heinz: *See—*
Reh, Lothar; Vydra, Karl; Doerr, Karl-Heinz; Grimm, Hugo; and Hennenberger, Karl-Heinz, 3,875,294.

Henrick, Clive A.: *See—*
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Henry Simon Limited: *See—*
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Holt, Barry; and Buckley, Norman Frank, 3,874,654.

Henry Sykes Limited: *See—*
Potter, Ernest William; Ratcliffe, William; and Allen, Ronald Noel, 3,874,182.

Hepworth, Paul: *See—*
Ellis, James Morgan Hunter; Hepworth, Paul; and Jhawar, Pannalal Sohanlal, 3,875,251.

Herberholz, Joe F. Outrigger lockup. 3,874,459, Cl. 172-311.000.

Hercules Incorporated: *See—*
Kruse, Walter M., 3,875,132.
Mirolli, Joseph E., 3,875,122.

Hergert, Richard E.: *See—*
Parker, Joseph D., deceased; Han, Shu Tang; and Hergert, Richard E., 3,874,509.

Hermann Berstorff Maschinenbau GmbH: *See—*
Gersbeck, Rolf; Reschke, Reinhold; and Posielsky, Reinhold, 3,874,962.

Hermann Traub, Firma: *See—*
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Hermes Sweeteners Ltd.: *See—*
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Herrmann, Hans H.: *See—*
Ross, Douglas; Herrmann, Hans H.; and Renschler, Harley Robert, 3,874,703.

Herschler, Michael G.; Anderson, Robert R.; and Shoop, John C., to Gardner-Denver Company. Rotary control valve for screw compressors. 3,874,828, Cl. 418-87.000.

Herwig, Walter; Cherdron, Harald; and Brinkmann, Ludwig, to Hoechst Aktiengesellschaft. Mixtures of thermoplastic polyamides. 3,875,129, Cl. 260-857.0TW.

Herwig, Walter; and Kleiner, Hans-Jerg, to Hoechst Aktiengesellschaft. Diphosphinic acid esters and process for making same. 3,875,263, Cl. 260-928.000.

Herwig, Walter: *See—*
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Hewlett-Packard Company: *See—*
Bridgham, John A., 3,875,413.
Riley, Russell B., 3,875,427.
Wade, John M.; Huff, Donald W.; and Furman, Jeffrey D., 3,875,523.

Hewlett-Packard Limited: *See—*
Baranyi, Andras; and Sarkany, Tamas, 3,875,512.

Hibino, Noburo; Seto, Kunihira; Kobayashi, Teruo; and Inoue, Kazuo, to Fuji Photo Film Co., Ltd. Polyethylene terephthalate film for use as support of X-ray film. 3,874,876, Cl. 96-84.00R.

Hickmann, Horst R.: *See—*
Andree, Robert T.; and Hickmann, Horst R., 3,874,105.

Hickner, Richard A.; Bredeweg, Corwin J.; and Plepys, Raymond A., to Dow Chemical Company, The. 3-Mercaptomethyl and 3-organothiomethyl-4-methyl. 3,875,187, Cl. 260-347.200.

Hicks, Charles L.; and Leon, Raymond R. Means for boring parallel holes. 3,874,463, Cl. 175-53.000.

Hidding, Walter E. Tamperproof cap. 3,874,540, Cl. 215-252.000.

Hieber, Josef, to Interbrew Betriebs- und Beteilgungs - AG. Preparation of beer. 3,875,303, Cl. 426-16.000.

Hielema, Ralph, to Kendall Company, The. Pipe coating. 3,874,418, Cl. 138-144.000.

Higashihara, Nobuo, to Sumitomo Shipbuilding & Machinery Co., Ltd. Submarine oil storage tank system. 3,874,179, Cl. 61-46.000.

Higgs, Cyril Edward, to Lever Brothers Company. Containers and closures therefor having wipe clean structure. 3,874,571, Cl. 222-558.000.

Highfill, Jack L.: *See—*
Coons, Harold L.; and Highfill, Jack L., 3,874,306.

Hikita, Isao. Cooling water intake apparatus for marine vessels. 3,874,317, Cl. 114-198.000.

Hikota, Yuji; Yoshino, Shizuki; and Ohtani, Atushi, to Hitachi Seiki Co., Ltd. Tool head for a turning machine. 3,874,257, Cl. 82-36.00A.

Hilbert, Francis H.; and Filliman, Paul Dean, to Motorola, Inc. Multichannel control circuit with D-C operated control devices. 3,875,334, Cl. 179-1.00D.

Hildenbrand, Jerry L., to Westinghouse Electric Corporation. Electrical bushing having a spiral tap assembly. 3,875,327, Cl. 174-143.000.

Hill, David E.; and Briar, Jack, to Allied Industries of Kansas, Inc. Article display and storage structure. 3,874,506, Cl. 206-229.000.

Hill, Edward Alexander, to TRW Inc. Method for controlling iron content of a zinc phosphating bath. 3,874,951, Cl. 148-6.15Z.

Hill, Joseph M.: *See—*
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Hill, Margaret Elizabeth: *See—*
Elks, Joseph; Phillipps, Gordon Hanley; Tulley, Alan; Stephenson, Leslie; and Hill, Margaret Elizabeth, 3,875,148.

Hill, Richard M.; Kramer, David A.; and Makino, Roy H., to Hughes Aircraft Company. Target detection system in a radar system employing main and guard channel antennas. 3,875,569, Cl. 343-5.00R.

Hintz, Robert T., to United States of America, Navy. Rotatable intracavity polarizer for gas lasers (CO_2 in particular). 3,875,529, Cl. 331-94.50C.

Hirashima, Kenzo: *See—*
Abe, Fumiyuki; Oka, Takashi; Fukuda, Shigeo; Matsui, Shunji; Hirashima, Kenzo; and Hosaka, Akio, 3,874,695.

Hirohashi, Toshiyuki: *See—*
Yamamoto, Hisao; Inaba, Shigeho; Okamoto, Tadashi; Hirohashi, Toshiyuki; Ishizumi, Kikuo; Yamamoto, Michihiro; Maruyama, Isamu; Mori, Kazuo; Kobayashi, Tsuyoshi; and Izumi, Takahiro, 3,875,142.

Hirohata, Shigeki: *See—*
Sato, Kazuo; Hirohata, Shigeki; and Oguro, Tomokatsu, 3,875,469.

Hiroyoshi, Hidaka: *See—*
Matsumoto, Ikyo; Nakagawa, Kanji; Matsuzaki, Meiki; and Horiuchi, Kenji, 3,875,170.

Hirsch, Jean-Jacques, to Societe Generale De Constructions Electriques et Mechaniques (Alsthom). Noise generator. 3,875,377, Cl. 235-92.0LG.

Hirsch, Jean-Jacques, to Societe Generale de Constructions Electriques et Mecaniques (Alsthom). Pseudo-independent noise generator. 3,875,528, Cl. 331-78.000.

Hisatomi, Takashi: *See—*
Seki, Chichitada; and Hisatomi, Takashi, 3,875,267.

Hisey, Robert W.; and Halwas, Larry E., to Gardner-Denver Company. Rotary drive and joint breakout mechanism. 3,874,196, Cl. 64-23.500.

Hitachi Electronics Co., Ltd.: *See—*
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Hitachi Ltd.: *See—*
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Fukui, Yukio; and Watanabe, Mitsuru, 3,875,361.
Hara, Hiroshi; and Onishi, Kazuo, 3,875,437.
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Kato, Shigeo; Masuko, Hitoshi; and Kameyama, Yukio, 3,874,778.
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Hitachi Maxell, Ltd.: *See—*
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Hitachi Seiki Co., Ltd.: *See—*
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Hnidek, Jaroslav: *See—*
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Ho, Shih M.: *See—*
Bratton, Raymond J.; and Ho, Shih M., 3,875,277.

Hobbs, Charles C.; and Van't Hof, Hendrik A., to Celanese Corporation. Liquid phase oxidation of esters to form carboxylic acids therefrom. 3,875,225, Cl. 260-541.000.

Hodes, Harvey A.; Sobieski, James F.; and Zerner, Michael C., to United States of America, Army. Method of forming a polymer coating. 3,875,025, Cl. 204-18.0PC.

Hodges, Wilbur C.: *See—*
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Hoebrechts, Albert J. G.: *See—*
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Hoefi, Werner H., to Signetics Corporation. Integrated direct-coupled electronic attenuator. 3,875,522, Cl. 330-30.00D.

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Hofer, Peter, to Georg Fischer Aktiengesellschaft. Explosively operated welding cartridge. 3,875,326, Cl. 174-94.00R.

Hoff, Lewis C.: *See—*
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Hoffman, George W.; Blankenship, H. Michael; and Granquist, William T., to NL Industries, Inc. Production of synthetic silicate minerals. 3,875,288, Cl. 423-118.000.

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Hoffman-La Roche, Inc.: *See—*
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Hogman, Medford N.; Shedd, James F.; Yett, Keith S.; and Kolve, Harold A., to United States of America, Navy. Underwater mobile target. 3,875,552, Cl. 340-5.00D.

Hokari, Saburo: *See—*
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Holben, Bernard C.; and Bach, Richard E., to Industrial Nucleonics Corporation. Nucleonic measuring apparatus. 3,875,417, Cl. 250-506.000.

Holden, Morell J., Jr., to Mobil Oil Corporation. Packaging support tray. 3,874,579, Cl. 229-2.500.

Holdt, Bernd-Dieter: *See—*
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Holeman, John M., to General Electric Company. Optical system for automatic meter reader. 3,875,406, Cl. 250-231.0SE.

Holland, Kenneth Craig; and Roberts, John Alan, to Tektronix Inc. High frequency fuse. 3,875,542, Cl. 333-97.00R.

Holm, William J., to Riggs & Lombard, Inc. Apparatus for uncurling the edges of a running web. 3,874,043, Cl. 26-68.000.

Holmes, Jerry D.: *See—*
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Holt, Barry; and Buckley, Norman Frank, to Henry Simon Limited. Mechanism for feeding cardboard or like blanks. 3,874,654, Cl. 271-99.000.

Holz, George E.: *See—*
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Homm, Roger; and Katz, Gilbert, to Ortho Pharmaceutical Corporation. Compositin for sustained release of a medicament and method of using same. 3,875,300, Cl. 424-28.000.

Honeyman, Robert Blakeley; and Crawford, Robert Lee, to Morden Machines Company. Pulper tank. 3,874,600, Cl. 241-46.170.

Honeywell Inc.: *See—*
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Honold, Ernst; Matthias, Heinz-Bernd; and Florjancic, Dusan, to Klein, Schanzlin & Becker Aktiengesellschaft. Fluid circulating apparatus. 3,874,813, Cl. 415-182.000.

Hooker Chemical Corporation: *See—*
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Hooley, Roy F.: *See—*
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Hopkins, Charles L., to McGraw-Edison Company. Temperature controller for fluid in an apparatus having a plurality of operation cycles. 3,875,424, Cl. 307-117.000.

Hopkins, Richard G.; and Stockhausen, Paul E., to MWA Company. Metal conditioning planetary grinder. 3,874,123, Cl. 51-120.000.

Hoppe, John C.: *See—*
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Horne, Frederick F.; and Vanderlans, Gerald G., to Airrigation Engineering Company, Inc. Method and apparatus for injecting foam into a pipe. 3,874,926, Cl. 134-24.000.

Hornig, Peter, to C.L.P. Fleck Shoe GmbH. Winding of sheets. 3,874,607, Cl. 242-67.10R.

Hornung, Friedrich, to Robert Bosch GmbH. Speed control system for a-c motors, which slows motor down when in overspeed condition and stops motor when in underspeed condition. 3,875,485, Cl. 318-227.000.

Hort, Eugene Victor, to GAF Corporation. Process for the purification of 2-hydroxyethylpyrrolidone. 3,875,184, Cl. 260-326.5FL.
Hort, Eugene Victor, to GAF Corporation. Process for the production of 2-hydroxyethylpyrrolidone. 3,875,185, Cl. 260-326.5FL.
Hosaka, Akio: *See—*
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Hosomi, Fumio: *See—*
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Howard, Donald W. Caddy for compacted-refuse. 3,874,547, Cl. 220-19.000.
Hoyt, Donald L.; and Altamira, Anthony F., to Texaco Inc. Tertiary recovery operation. 3,874,449, Cl. 166-245.000.
Hozumi, Kazuo, to Kabushiki Kaisha Marita Siesakusha. Apparatus for taking an X-ray picture of the head. 3,875,412, Cl. 250-491.000.
Huang, Shuan K. Dehydrogenating normal paraffins. 3,875,253, Cl. 260-683.300.
Huber, Johann, to Knorr-Bremse GmbH. Antiskid device for pressure-medium operated brakes. 3,874,744, Cl. 303-21.00F.
Huber, Robert J.; and Smith, Kent F., to General Instrument Corporation. Method for manufacturing metal oxide semiconductor integrated circuit of reduced size. 3,874,937, Cl. 148-1.500.
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Hudson, Gerald E. Buoy device for locating and retrieving sunken vessels. 3,874,013, Cl. 9-9.000.
Hudson, James N., to Molded Products Company. Blower housing. 3,874,191, Cl. 62-426.000.
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Humphrey, Anthony Martin, to Bush Boake Allen Limited. Preparation of isomerized hop extracts. 3,875,316, Cl. 426-349.000.
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Huneke, David M. Access limiting closure for containers. 3,874,564, Cl. 222-363.000.
Hunt, David H.; Allain, Raymond J.; and Maselek, Joseph E., to Spencer Turbine Company, The. Apparatus for filtering particulate matter from gas and having reverse flow cleaning means. 3,874,857, Cl. 55-302.000.
Hunt, Lenard A.; and Spitzer, Eugene H., to Jos. Schlitz Brewing Co. Livestock feed composition and method of preparing the same. 3,875,304, Cl. 426-31.000.
Hunt, Walter G.; and Belz, Ray J., to Anheuser-Busch Incorporated. Use of oxidized cationic starch in flocculation and dewatering of municipal sludge. 3,875,054, Cl. 210-54.000.
Hunter, Joseph E., Jr., to General Motors Corporation. Catalytic converter. 3,874,854, Cl. 23-288.00F.
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Hurd, Stanley E., to Motch & Merryweather Machinery Company, The. Orienting apparatus for cap-shaped members. 3,874,740, Cl. 302-31.000.
Hureau, Jean-Claude; Rota, Benjamin; and Thomas-Castelnau, Philippe, to Generale Alimentaire. Process for making plastics mesh structures. 3,874,969, Cl. 156-167.000.
Hurley, Joseph John, to J & P Coats Limited. Yarn tensioning device. 3,874,612, Cl. 242-149.000.
Hurst, Kurt, to Robert Bosch GmbH. Line-writing apparatus with plural print heads in parallel rows. 3,874,492, Cl. 197-1.00R.
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I. I. Communications, Inc.: *See—*
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Iacovazzi, Michael A.; and Basile, Aldo, to Emhart Corporation. Glass feeder tube operating mechanism. 3,874,866, Cl. 65-164.000.
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Ikeno, Osamju, to Kabushiki Kaisha Suwa Seikosha. Liquid crystal display timepiece with variable contrast. 3,874,163, Cl. 58-50.00R.
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Inglis, Douglas Johnstone, to Stenberg-Flygt AB. Device for sewage treatment. 3,875,056, Cl. 210-93.000.

Inoue, Eiichi; Kokado, Hiroshi; Shimizu, Isamu; and Ohtsuka, Shuichi, to Fuji Photo Film Co., Ltd. Sensitizing a mixture of silver halide and lead halide by heat. 3,874,881, Cl. 96-88.000.

Inoue-Japan Research Inc.: *See—*
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Inoue, Kazuo: *See—*
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Inoue, Kiyoshi, to Inoue-Japan Research Inc. EDM parameter control system. 3,875,374, Cl. 219-69.00G.

Inoue, Taisei, to Kuraray Co., Ltd. Gelled vinyl alcohol polymers and articles therefrom. 3,875,302, Cl. 426-1.000.

Institut Dr. Friedrich Forster, Prufgeratebau: *See—*
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Irwin, James S.; and Steel, Francis R., to Motorola, Inc. Crystal controlled overtone oscillator having a rejection circuit for preventing oscillation at undesired overtones. 3,875,533, Cl. 331-116.00R.

Isaacs, David; Fried, David L.; and Ameer, George A., to Color Control, Inc. Method and apparatus for color spectrophotometry. 3,874,799, Cl. 356-173.000.

Isaacs, Jacques Harold, to Textron Inc. Storage and display assembly. 3,874,758, Cl. 312-278.000.

Isaacson, Max; and Smilg, Benjamin, to Globe Safety Products, Inc. Combined resuscitator and inhalator apparatus. 3,874,378, Cl. 128-145.800.

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Iselin, Beat; and Sieber, Peter, to Ciba-Geigy Corporation. Process for the temporary protection of amino groups in peptide syntheses. 3,875,207, Cl. 260-471.00C.

Ishibashi, Shizuka; and Eto, Yoshizumi, to Hitachi, Ltd.; and Hitachi Electronics Co., Ltd. Color television camera. 3,875,586, Cl. 358-44.000.

Ishida, Takashi. Fuel supply system for an internal combustion engine. 3,874,352, Cl. 123-119.00R.

Ishihara, Koichi, to Fuji Oil Company, Limited. Delivery system for high melting point oils in a tank. 3,874,399, Cl. 137-13.000.

Ishii, Katsutoshi, to Seiko Seiki Kabushiki Kaisha. Centerless workholding apparatus for a machine tool. 3,874,128, Cl. 51-236.000.

Ishikawa, Chuji, to Ricoh Co., Ltd. Printing apparatus. 3,874,286, Cl. 101-93.180.

Ishikawa, Mahito: *See—*
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Ismail, Mohamed Roshdy; and Raalf, Hans, to Dynamit Nobel AG. Stabilizers for chlorine-containing polymers. 3,875,110, Cl. 260-45.75Z.

Isonaka, Kenji; Hokari, Saburo; Watanabe, Tatsuya; and Furukawa, Masamichi, to Ricoh Co., Ltd. Developing device for electrophotography. 3,874,328, Cl. 118-116.000.

Ito, Takao: *See—*
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Iwaisako, Toshyyuki; Ohki, Kusuo; Kominami, Naoya; and Yomogida, Hisao, to Asahi Kasei Kogyo Kabushiki Kaisha. Reforming process using platinum-lead-third component catalyst and catalyst therefor. 3,875,048, Cl. 208-139.000.

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Deckert, Helmut; Heinke, Wolfgang; Jacob, Herbert; and Kirschner, Helmut, 3,874,129.

Jacobs, Herbert V. Disposable paintbrushes. 3,874,021, Cl. 15-202.000.

Jacquemin, Jean: *See—*
d'Hervilly, Guy; Edel, William A.; Jacquemin, Jean; and Westdorp, W. Alfred, 3,874,936.

Jacuzzi Research, Inc.: *See—*
Jacuzzi, Roy A., 3,874,374.

Jacuzzi, Roy A., to Jacuzzi Research, Inc. Hydromassage tub and air induction system therefor. 3,874,374, Cl. 128-66.000.

Jaggar, Gilbert R. Electrical apparatus. 3,875,479, Cl. 317-101.0CM.

Jakob, Herbert Edward: *See—*
Brock, James Donald; Mize, Erbie Gail; and Jakob, Herbert Edward, 3,874,523.

Jakszt, Werner, to Siemens Aktiengesellschaft. Voltage overload arrester for high-voltage switching system. 3,875,466, Cl. 317-62.000.

James Mackie & Sons Limited: *See—*
Mackie, William Denis Grenville, 3,874,421.

Jamieson, Charles P., to Airco Inc. Die for extrusion of fine grained green carbon. 3,874,837, Cl. 425-378.000.

Janzon, Karlheinz: *See—*
Hein, Hilmar; Janzon, Karlheinz; Weigert, Wolfgang; Liedtke, Christa; and Muller, Rudolf, 3,875,186.

Japanese National Railways and Kayabakogyo Kabushikikaisha: *See—*
Sema, Katsutosh; Wakao, Mitsuru; Kobayashi, Yoshinori; and Hara, Koichi, 3,874,305.

Jarron, Robert C.; and Petersen, Peter L. Repaired base plate for ingot mold. 3,874,628, Cl. 249-204.000.

Jazina, John: *See—*
Mandish, John Jerome, 3,875,590.

Jeanson, Richard L., to G. B. Lewis Company. Method and apparatus for making a sheet molding compound. 3,874,973, Cl. 156-192.000.

Jeck, Arnulf: *See—*
Buschmann, Karl; Diewald, Josef; Feind, Klaus; Friebe, Juergen; and Jeck, Arnulf, 3,874,592.

Jefferson Chemical Company, Inc.: *See—*
Ramey, Bobbie Joe; and Cuscurida, Michael, 3,875,086.
Waddill, Harold George, 3,875,072.

Jeger, Oskar: *See—*
Wehrli, Hansuli; and Jeger, Oskar, 3,875,143.

JENAer Glaswerk Schott & Gen.: *See—*
Gliemeroth, Georg; and Meckel, Lothar, 3,875,321.

Jennings, Ralph E.: *See—*
Barth, Gerald D.; and Jennings, Ralph E., 3,874,263.

Jentsch, Hans G. Multi-way tap for a filling machine. 3,874,825, Cl. 417-519.000.

Jesevich, John; and Simkus, Vyto, to American Flange & Manufacturing Co., Inc. Closure forming apparatus. 3,874,058, Cl. 29-208.00D.

Jhawar, Pannalal Sohanlal: *See—*
Ellis, James Morgan Hunter; Hepworth, Paul; and Jhawar, Pannalal Sohanlal, 3,875,251.

Jidosha Kiki Kabushiki Kaisha: *See—*
Masuda, Naosuke, 3,874,172.

Jilek, Jaromir, to Universite Palackeno V. Olomouci. Arrangement for and method of obtaining a first, second or following derivative of a titration curve. 3,875,395, Cl. 235-183.000.

Jisova, Vaclava: *See—*
Lim, Draholav; Kolinsky, Miloslav; and Jisova, Vaclava, 3,875,131.

Johannes, James H., to General Mills, Inc. Dry mix for frosted brownies. 3,875,309, Cl. 426-152.000.

Johannessen, Sverre: *See—*
Stenersen, Erik; and Johannessen, Sverre, 3,875,549.

Johansen, Ebbe: *See—*
Sorensen, Soren Kai; Andersen, Jorgen; Johansen, Ebbe; and Lund, Jorgen Aage Preben, 3,874,850.

Johansson, Benny: *See—*
Dahlqvist, Jan; Matsson, Bo; and Johansson, Benny, 3,875,330.

Johansson, Leif: *See—*
Rjork, Bengt; Gustafsson, Bertil; and Johansson, Leif, 3,874,467.

John Wyeth & Brother Limited: *See—*
Archibald, John Leheup; Boyle, John Terence Arnott; and Saunders, John Christopher, 3,875,165.

Johns-Manville Corporation: *See—*
Bodycomb, Frederick Mercer, Jr.; and Barna, James Julius, 3,875,504.
Garcia, Leonardo M., 3,874,966.

Johnson, Carl W.: *See—*
Alexander, Donald R.; and Johnson, Carl W., 3,874,585.

Johnson Corporation, The: *See—*
Calkins, Donald L., 3,874,707.

Johnson, Dale Bernard, to JWI Ltd. Agitator blade for use below forming wire of paper making machine. 3,874,998, Cl. 162-308.000.

Johnson, Edward John: *See—*
Shepherd, Warren Arnold, Jr.; Ketchpel, Paul Allison, Jr.; Johnson, Edward John; and Biondi, Frank George, 3,874,433.

Johnson, Philip: *See—*
O'Dea, Orrin B.; Johnson, Philip; and Morrison, Ralph, 3,875,346.

Johnson, Reynold B.; and Irvin, Ronald D., to Education Engineering Associates. Record press for duplicating pre-recorded records. 3,874,836, Cl. 425-363.000.

Johnson, Robert E., to McDonnell Douglas Corporation. Stol flaps. 3,874,617, Cl. 244-42.0DA.

Johnsson, Bo, to Svenska Rotor Maskiner Aktiebolag. Pack of heat absorbing material and a support member therefor. 3,874,442, Cl. 165-10.000.

Johnston, David B. R.: *See—*
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Johst, Wolfgang: *See—*
Simon, Stefan; and Johst, Wolfgang, 3,874,032.

Jones, David A.; and Mazur, Robert H., to G. D. Searle & Co. N-Substituted aspactyl peptide amids. 3,875,137, Cl. 260-112.500.

Jones, Isaac P.: *See—*
Richards, David O.; Jones, Isaac P.; Duffee, Homer W.; and Nutter, Charles E., 3,874,980.

Jones, James S.: *See—*
Filepp, Leslie; Jones, James S.; and Allia, Charles, 3,874,194.

Jones & Laughlin Steel Corporation: *See—*
Grozier, John David; and Bell, John Ray, 3,874,950.

Jones, Lloyd K.; and Yanov, David A., to Elk Manufacturing Company, Inc. Canted gasket valve construction. 3,874,637, Cl. 251-345.000.

Jones, Robert L., to University Court of The University of Edinburgh, The. Enzymatic process for producing prostaglandins C. 3,875,004, Cl. 195-30.000.

Jones, Ronald N.: *See—*
Hauser, Hans; and Jones, Ronald N., 3,874,248.

Jones, Stanley C.; and Parson, Robert W., to Marathon Oil Company. Determination of oil saturation in a reservoir. 3,874,451, Cl. 166-252.000.

Jones, William A. A.: *See—*
Fox, Austin L.; and Jones, William A. A., 3,874,581.

Jordan, James A., to Ford Motor Company. Injection molded seating. 3,874,731, Cl. 297-452.000.

Jordan, William E., to Xerox Corporation. Fail-safe mechanism for stopping movement of the photoconductive belt in an electrostatic reproduction machine when tracking of the belt becomes irregular and uncontrollable. 3,874,790, Cl. 355-16.000.

Jos. Schlitz Brewing Co.: *See—*
Hunt, Lenard A.; and Spitzer, Eugene H., 3,875,304.

Jossa, Louis J.: *See—*
Keijzer, Johan H.; van den Berg, Johan V.; Wijnhoven, Jan M. A.; Jossa, Louis J.; and Moonen, August G. L., 3,874,487.

Jouffret, Michel: *See—*
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Juhe, Michel: *See—*
Asler, Karl-Heinz; Bonin, Andre; Dubuisson, Georges; Juhe, Michel; Reichardi, Wolfgang; Fauser, Edwin; and Eisele, Hermann, 3,874,351.

Juhn, Hyunil: *See—*
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Jules Silver: *See—*
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Jungkind, Roland: *See—*
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JWI Ltd.: *See—*
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K & K Manufacturing, Inc.: *See—*
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Kabushiki Kaisha Dowa: *See—*
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Kabushiki Kaisha Komatsu Seisakusho: *See—*
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Kabushiki Kaisha Maekawa Seisakusho: *See—*
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Kabushiki Kaisha Marita Siesakusha: *See—*
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Kabushiki Kaisha Richo: *See—*
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Kabushiki Kaisha Ricoh: *See—*
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Kabushiki Kaisha Suwa Seikosha: *See—*
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Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
Okubo, Kenji; Endo, Satour; and Oka, Shoji, 3,874,751.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See—*
Arai, Tohru; Obayashi, Mikio; and Endo, Junji, 3,874,909.

Kabushiki Kaisha Yaskawa Denki Seisakusho: *See—*
Yagi, Takashi; Nanai, Sadaaki; Ouhara, Souji; and Shirakawa, Yukihiro, 3,875,468.

Kachel, Helmut: *See—*
Worschech, Kurt; Wolf, Kurt; and Kachel, Helmut, 3,875,069.

Kaduk, Edward E.; and Olwert, Ronald J., to General Electric Company. Undercoat for phosphor in reprographic lamps having titanium dioxide reflectors. 3,875,455, Cl. 313-489.000.

Kaelin, Joseph Richard. Tank clarification plant. 3,875,057, Cl. 210-104.000.

Kaelin, Joseph Richard. Surface ventilation rotor. 3,875,279, Cl. 261-91.000.

Kahle, William J. Toy ball. 3,874,663, Cl. 273-26.00R.

Kahler, Charles; and Kimes, Lucas James, to Boeing Company, The. Reversing apparatus for a jet engine. 3,874,620, Cl. 244-110.00B.

Kahn, David, to AMP Incorporated. Current surge eliminator. 3,875,547, Cl. 338-219.000.

Kaiser Aluminum & Chemical Corporation: *See—*
Coatney, Richard L.; Housh, Lloyd M.; and Van Dreser, Merton L., 3,875,298.

Kaiser, Hermann: *See—*
Brandl, Herman; Kaiser, Hermann; Richert, Hans; Rozanski, Franz; Suchy, Herbert; and Hunecke, Theodor, 3,875,231.

Kajima Kensetsu Kabushiki Kaisha: *See—*
Muto, Kiyoshi; Yamamoto, Yasuhisa; Toyoda, Yoshinori; Azemi, Shozo; Okano, Shigeru; Masuyama, Kenya; Aihara, Seitaro; Ito, Takao; Ogawa, Isamu; and Harada, Mitsumasa, 3,874,062.

Kakeno, Sadao, to Kabushiki Kaisha Richo. Intergrating counter. 3,875,376, Cl. 235-92.00C.

Kali-Chemie Aktiengesellschaft: *See—*
Hellberg, Karl-Heinz; and Massonne, Joachim, 3,875,291.

Kaller, Sigurd. Sealing device. 3,874,679, Cl. 277-37.000.

Kamber, Bruno, to Ciba-Geigy Corporation. Process for the manufacture of peptides containing cystine. 3,875,136, Cl. 260-112.500.

Kamei, Takeo: *See—*
Suzuki, Iwao; Kamei, Takeo; and Sonoda, Ryuichi, 3,875,128.

Kamei, Tatsuya: *See—*
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Kameyama, Yukio: *See—*
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Kamijo, Hirotaka: *See—*
Kubota, Koji; Kamijo, Hirotaka; Mihara, Osamu; Okumura, Shinji; and Okada, Hiroshi, 3,875,001.

Kanda, Hiroshi: *See—*
Sakita, Takashi; Kanda, Hiroshi; and Yamagami, Yasumasa, 3,874,279.

Kaneda, Ben, to Merck & Co., Inc. Cell culture apparatus. 3,875,000, Cl. 195-1.700.

Kaneda, Kazuyoshi; Suzuki, Yasushi; and Aoshima, Yasuo, to Riken Lightmetal Industry Company, Limited. Process for decorating an aluminum substrate with a colored design. 3,874,949, Cl. 148-6.270.

Kankaanpaa, Matti, to Valmet Oy. Multiple cylinder drier in a paper machine. 3,874,997, Cl. 162-290.000.

Kano, Motomi: *See—*
Arikawa, Masayasu; Watanabe, Toshihiko; and Kano, Motomi, 3,875,363.

Kano, Tsuyoshi; Saitoh, Tadashi; Suzuki, Atsushi; Suzuki, Teruki; Minagawa, Shigekazu; and Otomo, Yoshiro, to Hitachi, Ltd. Multicolor semiconductor lamp. 3,875,456, Cl. 313-501.000.

Kapp, Edward J., to United States of America, Navy. Destructible microelectronic circuit element. 3,875,431, Cl. 307-298.000.

Kappenhagen, George A., to Westinghouse Electric Corporation. Dimmer for discharge lamp utilizing a pulse enabling circuit. 3,875,458, Cl. 315-194.000.

Kappenhagen, George A., to Westinghouse Electric Corporation. Synthesis of dimmer output waveform within the dimmer logic circuit. 3,875,460, Cl. 315-291.000.

Kapustin, Alexander. Space heating device using solid fuel. 3,874,362, Cl. 126-67.000.

Karass, Thomas John. Strapping formed by bonding co-extending filaments with a polymeric composition. 3,874,985, Cl. 161-143.000.

Karg, Walter Erwin. Damper controller. 3,874,401, Cl. 137-77.000.

Karpf, Kurt: *See—*
Moser, Heinz; and Karpf, Kurt, 3,874,003.

Kasai, Toshiyuki, to Nippon Kogaku K.K. Ellipsometer. 3,874,797, Cl. 356-118.000.

Kasten, Roy F., Jr.: *See—*
Atlee, Zed J.; and Kasten, Roy F., Jr., 3,875,028.

Kato, Eiji, to Kabushiki Kaisha Maekawa Seisakusho. Oil cooling apparatus for refrigerators. 3,874,192, Cl. 62-473.000.

Kato, Hajime: *See—*
Hayashi, Takao; and Kato, Hajime, 3,874,895.

Kato, Koso; and Shiosaka, Makota, to Hayashibara Biochemical Laboratories, Incorporated. Food compositions containing pullulan. 3,875,308, Cl. 426-152.000.

Kato, Michio: *See—*
Ohrui, Tetsuya; Sakakibara, Yasuhito; Aono, Yukinaga; Kato, Michio; Takao, Hiroshi; and Kawaguchi, Tsunejiro, 3,875,212.

Kato, Sadamu, to Toyoda Koki Kabushiki Kaisha. Machine tool with automatic tool changing device. 3,874,071, Cl. 29-568.000.

Kato, Shigeo; Masuko, Hitoshi; and Kameyama, Yukio, to Hitachi, Ltd.; and Nippon Hoso Kyokai. Rotary mirror scanner. 3,874,778, Cl. 350-7.000.

Kato, Tetuo: *See—*
Katsumori, Teiji; Ohsaka, Yoshisuke; and Kato, Tetuo, 3,874,486.

Kato, Yasuyuki; Moritani, Masahiko; Konishi, Shuichi; and Tatsukami, Yoshiharu, to Sumitomo Chemical Company Limited. Grafting methyl methacrylate monomer into a epoxy copolymer backbone. 3,875,255, Cl. 260-836.000.

Kato, Yoshiya, to Misawa Homes Institute of Research & Development. Wall panel for prefabricated housing. 3,874,148, Cl. 52-753.00Y.

Katsume, Tetsuo; and Horiuchi, Toshihiro, to Nissan Motor Company Limited. Gas turbine control with fuel shut-off and ignition upon deceleration. 3,874,167, Cl. 60-39.28R.

Katsumori, Teiji; Ohsaka, Yoshisuke; and Kato, Tetuo, to Tokico Ltd. Shock absorber and suspension strut. 3,874,486, Cl. 188-314.000.

Katz, Gilbert: *See—*
Homm, Roger; and Katz, Gilbert, 3,875,300.

Katzman, Stanley; and Gordon, Marvin N. Dispensing tube having cap to body attachment. 3,874,570, Cl. 222-543.000.

Kaunzinger, Helmuth M.: *See—*
Buser, Rudolf G.; and Kaunzinger, Helmuth M., 3,874,616.

Kawaguchi, Tsunejiro: *See—*
Ohrui, Tetsuya; Sakakibara, Yasuhito; Aono, Yukinaga; Kato, Michio; Takao, Hiroshi; and Kawaguchi, Tsunejiro, 3,875,212.

Kawakami, Akira: *See—*
Gamo, Hiroshi; and Kawakami, Akira, 3,874,956.

Kawakami, Koichi; and Osaki, Tatsuo, to Yoshida Kogyo Kabushiki Kaisha. Slider holder with a self-actuated release mechanism. 3,874,057, Cl. 29-207.5SL.

Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Toyooka, Terumasa; and Terai, Kiyoshi, 3,874,067.

Kawasaki, Jun: *See—*
Endou, Hirohide; Kitazume, Yoshiaki; Kawasaki, Jun; and Hatsukano, Yoshikazu, 3,875,565.

Kawasaki, Kentaro; and Takizawa, Keizo, to Chori Company Limited. Method of and apparatus for producing partially bulked yarn. 3,874,153, Cl. 57-34.0HS.

Kawashima, Tetsuya, to Hasino, Ko. Aerosol Atomizing device. 3,874,565, Cl. 222-402.140.

Kay, James C., to Kay-Townes Inc. Broad-band antenna having folded dipoles with hairpin transformers. 3,875,572, Cl. 343-803.000.

Kay-Townes Inc.: *See—*
Kay, James C., 3,875,572.

Kazan, Benjamin, to International Business Machines Corporation. High writing speed dark-trace tube with flood beam enhancement. 3,875,447, Cl. 313-465.000.

Kazan, Benjamin; and Sedgwick, Thomas O., to International Business Machines Corporation. Field responsive photoluminescent display devices. 3,875,457, Cl. 315-11.000.

Keeler, Miner S., II. Electrical computing system for simultaneously performing a plurality of operations on two or more operands. 3,875,392, Cl. 235-156.000.

Keen, Bruce Henry: *See—*
Slasor, James Francis; and Keen, Bruce Henry, 3,874,611.

Keijzer, Johan H.; van den Berg, Johan V.; Wijnhoven, Jan M. A.; Jossa, Louis J.; and Moonen, August G. L., to Monroe Belgium N.V. Shock absorber. 3,874,487, Cl. 188-322.000.

Keithley Instruments, Inc.: *See—*
Cath, Pieter G.; and Erdman, Robert J., 3,875,506.

Keller, Albin. Method of and apparatus for determining the tension of filamentary material. 3,874,230, Cl. 73-143.000.

Kelly, Robert J.: *See—*
Foster, Edward P.; Kelly, Robert J.; and Sage, Warnie L., 3,875,357.

Kemp, Thomas, to Produits Chimiques Pechiney-Saint Gobain. Preparation with seeding of polymers insoluble in their monomeric compositions. 3,875,130, Cl. 260-87.100.

Kemper, Clyde F.: *See—*
Cover, Paul F.; Rife, John W.; and Kemper, Clyde F., 3,874,498.

Kemper, Kate. Transport device. 3,874,495, Cl. 198-137.000.

Kemper, Kate. Kneading and mixing machine. 3,875,423, Cl. 307-113.000.

Kendall Company, The: *See—*
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Kennecott Copper Corporation: *See—*
Harvey, Walter W.; Randlett, Myron R.; and Bangerskis, Karlis I., 3,875,041.

Kennedy, Carl D.: *See—*
Clark, Charles R.; Gregory, M. Duane; Kerfoot, Oliver C.; Veatch, Fred C.; Krehbiel, Delmar D.; and Kennedy, Carl D., 3,874,454.

Kennedy, James Blakely, to Bell Telephone Laboratories, Incorporated. Trunk busy test circuit. 3,875,351, Cl. 179-175.30R.

Kennedy, John P., to Design Elements, Inc. Phone coupler. 3,875,335, Cl. 179-1.00C.

Kennedy, Richard Thomas, to Bell Electric Company. Electric wire and wire termination assembly. 3,874,767, Cl. 339-147.00R.

Kenney, Donald K. Drapery sewing apparatus. 3,874,311, Cl. 112-121.140.

Kenney, Donald Sykes: *See—*
Wadley, Clark Searle; and Kenney, Donald Sykes, 3,875,015.

Kenney, Richard A.: *See—*
Greenwald, Emmett T.; and Kenney, Richard A., 3,874,965.

Kerfoot, Oliver C.: *See—*
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Kerlin, Kurt: *See—*
Kral, Jan; Kerlin, Kurt; Gratza, Heldemar; and Harazim, Alfons, 3,874,245.

Kern & Co. AG: *See—*
Nunlist, Rene, 3,874,087.

Kern, Loyd R., to Atlantic Richfield Company. Method and apparatus for electrically heating a subsurface formation. 3,874,450, Cl. 166-248.000.

Kertel, Stanley S., to Eastman Kodak Company. Silver halide color developer containing ketomethylene photographic color-forming couplers. 3,874,948, Cl. 96-56.300.

Kessler, Eugene S.; and Getz, John E., to Fruehauf Corporation. Restraint for conveyorized trailers and the like. 3,874,538, Cl. 214-516.000.

Ketchpel, Paul Allison, Jr.: *See—*
Shepherd, Warren Arnold, Jr.; Ketchpel, Paul Allison, Jr.; Johnson, Edward John; and Biondi, Frank George, 3,874,433.

Kewaunee Scientific Equipment Corporation: *See—*
Saunders, George T.; Lattuca, Joseph S.; and Richards, Dorman C., 3,874,754.

Kiefer, Frank I., Jr.; Clark, Billy R.; and Ware, James M., to Texas-U.S. Chemical Company. Method and means of sensing characteristics of a bath. 3,875,021, Cl. 204-1.00T.

Kiefer, George E.; and Guth, Lauren W., to General Electric Company. Food waste disposer. 3,875,462, Cl. 317-13.00R.

Kiessling, Hans-Joachim: *See—*
Hofel, Heinz-Bernhard; Kiessling, Hans-Joachim; and Lampert, Fred, 3,875,089.

Kikuchi, Makoto; and Otsu, Ikuo, to Toyoda Koki Kabushiki Kaisha. Workpiece mounting apparatus for an internal grinding machine. 3,874,121, Cl. 51-105.00R.

Kikuchi, Masafumi; and Takeda, Masashi, to Sony Corporation. Automatic gain control circuit. 3,875,521, Cl. 330-29.000.

Killer, James Donald. Mechanical boat loading device. 3,874,535, Cl. 214-450.000.

Kim, Dong W.: *See—*
Kwon, Young D.; Butler, Russell H.; Oswald, Hendrikus J.; and Kim, Dong W., 3,874,044.

Kim, Inna Pavlovna: *See—*
Dalmatov, Vsevolod Yakolevich; Kim, Inna Pavlovna; Voronkova, Tamara Georgievna; and Moschansky, Nikolai Alexeevich, 3,874,887.

Kim, Keun Young, to Monsanto Co. Amorphous calcium sodium pyrophosphate. 3,875,289, Cl. 423-306.000.

Kimberly-Clark Corporation: *See—*
Steinert, Thor W., 3,874,961.

Kimes, Lucas James: *See—*
Kahler, Charles; and Kimes, Lucas James, 3,874,620.

King, Francis P.; King, Thomas T.; and Sprow, Earnest A. Sheet shingling machine. 3,874,648, Cl. 270-53.000.

King, Kenneth L. Anchor terminals for headed tie rods. 3,874,805, Cl. 403-360.000.

King, Terry D.; and Mills, Noel L., to Alton Ochsner Medical Foundation. Shunt defect closure system. 3,874,388, Cl. 128-334.00R.

King, Thomas T.: *See—*
King, Francis P.; King, Thomas T.; and Sprow, Earnest A., 3,874,648.

Kino, Gordon S.: *See—*
Quate, Calvin F.; Havlice, James F.; and Kino, Gordon S., 3,875,550.

Kinsinger, William C.; Ippolito, James; and Pisarri, Vincent, to Metagraphic Systems, Inc. Adjustment mechanism for a lens and prism mounted within a film viewer. 3,874,772, Cl. 350-247.000.

Kirchhofer, Hubert; Perevuznik, Josef; and Wunsch, Alfred. Method of and apparatus for reducing harmful emissions from internal combustion engines. 3,874,166, Cl. 60-39.020.

Kirchmayr, Rudolf, to Ciba-Geigy AG. Upsilon-triazole compounds possessing a modified methyl group in the 4-position. 3,875,178, Cl. 260-308.00A.

Kirkham, Arthur J. Tentage structure. 3,874,396, Cl. 135-1.00R.

Kirschner, Helmut: *See—*
Deckert, Helmut; Heinke, Wolfgang; Jacob, Herbert; and Kirschner, Helmut, 3,874,129.

Kirsen, Bernard, to GAF Corporation. Apparatus for applying liquid to a web. 3,874,331, Cl. 118-227.000.

Kitagawa, Sadao: *See—*
Tashiro, Kijuro; Yokoyama, Masuzo; Kitagawa, Sadao; and Masukawa, Shoichi, 3,875,126.

Kitazawa, Shin-Ich; Negishi, Takao; and Susami, Kozo, to Toray Industries, Inc. Process for producing high bulky yarn by false-twisting system. 3,874,160, Cl. 57-157.0TS.

Kitazume, Yoshiaki: *See—*
Endou, Hirohide; Kitazume, Yoshiaki; Kawasaki, Jun; and Hatsukano, Yoshikazu, 3,875,565.

Kizler, Harald: *See—*
Schmidt, Peter; Kizler, Harald; Maisch, Wolfgang; Peter, Bernd; Wahl, Josef; Linder, Ernst; and Neidhard, Horst, 3,874,171.

Klee, John Michael: *See—*
Wood, Gillies; and Klee, John Michael, 3,874,200.

Klein, Eberhard, to Blaupunkt-Werke GmbH. Circuit for switching the audio frequency output in an AM-FM broadcast receiver. 3,875,514, Cl. 325-316.000.

Klein, Schanzlin & Becker Aktiengesellschaft: *See—*
Hanagarth, Wolfgang, 3,874,812.
Honold, Ernst; Matthias, Heinz-Bernd; and Florjancic, Dusan, 3,874,813.

Kleiner, Hans-Jerg: *See—*
Herwig, Walter; and Kleiner, Hans-Jerg, 3,875,263.

Kleppe, Peder J., to Westvaco Corporation. Polysulfide impregnation of lignocellulosic materials in a continuous digester. 3,874,991, Cl. 162-19.000.

Klesow, Gerald F. Automatic sprinkler valve. 3,874,455, Cl. 169-19.000.

Kloefkorn, Earl W. Fuel feeding system for a vehicle. 3,874,471, Cl. 180-54.00R.

Kloss, Dale D., to K & K Manufacturing, Inc. Liquid supplement pump for suckling animal feeder. 3,874,342, Cl. 119-71.000.

Klotzer, Wilhelm: *See—*
Bretschneider, Hermann; Klotzer, Wilhelm; Bader, Gunther; and Lutz, August, 3,875,182.

Klugman, Warren L.; and Kosmider, Jerome, to Ceilcote Company, The. Method and apparatus for electrostatic removal of particulate from a gas stream. 3,874,858, Cl. 55-118.000.

Kluksdahl, Harris E., to Chevron Research Company. Platinum-tin catalyst regeneration. 3,875,049, Cl. 208-140.000.

Knappe, LaVerne Frank, to International Business Machines Corporation. Modular punch device. 3,875,480, Cl. 317-123.000.

Knight, Jack B., to Philip Morris Incorporated. Apparatus for spreading tows of fibrous materials. 3,874,030, Cl. 19-65.00T.

Knights, Evord F., to Union Oil Company of California. Wax coated paper of improved water resistance. 3,874,905, Cl. 117-76.00P.

Knoblauch, Rainer, to Robert Bosch GmbH. Radial piston motor. 3,874,274, Cl. 91-498.000.

Knohl, Herbert: *See—*
Patience, Donald; Swallow, Roger T.; Hartigan, Edward G.; and Knohl, Herbert, 3,874,001.

Knopka, William N., to FMC Corporation. Flame-retardant fiber blend. 3,874,155, Cl. 57-140.0BY.

Knopka, William N., to FMC Corporation. Flame-retardant fiber blend. 3,874,157, Cl. 57-140.0BY.

Knorr-Bremse GmbH: *See—*
Huber, Johann, 3,874,744.
Nadas, Gyula; and Wosegien, Bernd, 3,874,484.
Pollinger, Hans; Wosegien, Bernd; Saumweber, Eckart; and Storzinger, Thomas, 3,874,746.

Knupp, John Lawrence, Jr.: *See—*
Harden, John Charles; Knupp, John Lawrence, Jr.; and Mastrangelo, Sebastian Vito Rocco, 3,875,434.

Kobayashi, Kohroh; and Ueki, Atsufumi, to Nippon Selfoc Company, Limited. Semiconductor laser device having a light focusing transmission. 3,875,532, Cl. 331-94.50H.

Kobayashi, Mizuho, to Amano Pharmaceutical Co., Ltd. Lipid metabolism improving and anti-atheromatic agent. 3,875,007, Cl. 195-62.000.

Kobayashi, Tadaki: *See—*
Hayashi, Junichi; and Kobayashi, Tadaki, 3,874,210.

Kobayashi, Teruo: *See—*
Hibino, Noburo; Seto, Kunihira; Kobayashi, Teruo; and Inoue, Kazuo, 3,874,876.

Kobayashi, Tsuyoshi: *See—*
Yamamoto, Hisao; Inaba, Shigeho; Okamoto, Tadashi; Hirohashi, Toshiyuki; Ishizumi, Kikuo; Yamamoto, Michihiro; Maruyama, Isamu; Mori, Kazuo; Kobayashi, Tsuyoshi; and Izumi, Takahiro, 3,875,142.

Kobayashi, Yoshinori: *See—*
Sema, Katsutosh; Wakao, Mitsuru; Kobayashi, Yoshinori; and Hara, Koichi, 3,874,305.

Kobe Steel, Ltd.: *See—*
Arikawa, Masayasu; Watanabe, Toshihiko; and Kano, Motomi, 3,875,363.

Koch, Paul J.; Pearce, Eli M.; and Lapham, Julie A., to Allied Chemical Corporation. Deep dyeable, lusterous, and fire-retardant linear polyester composition. 3,875,108, Cl. 260-45.70P.

Kodaira, Kozo; and Tamai, Kazuto, to Kabushiki Kaisha Suwa Seikosha; and Shinshu Seiki Kabushikik Kaisha. Printer. 3,874,285, Cl. 101-93.280.

Kogawa, Takashi: *See—*
Thuruoka, Hisashi; and Kogawa, Takashi, 3,875,564.

Kokado, Hiroshi: *See—*
Inoue, Eiichi; Kokado, Hiroshi; Shimizu, Isamu; and Ohtsuka, Shuichi, 3,874,881.

Kokusai Cable Ship Kabushiki Kaisha: *See—*
Matsuzaki, Akira; and Hamura, Terasu, 3,874,960.

Kolarik, Jan: *See—*
Heidingsfeld, Viktor; Hudecek, Slavko; Hnidek, Jaroslav; Kolarik, Jan; and Zelinger, Jiri, 3,875,261.

Kolb, James M.: *See—*
Franks, Charles R.; Schenker, Barry A.; O'Leary, Kevin J.; and Kolb, James M., 3,875,043.

Kolinsky, Miloslav: *See—*
Lim, Drahoslav; Kolinsky, Miloslav; and Jisova, Vaclava, 3,875,131.

Kolve, Harold A.: *See—*
Hogman, Medford N.; Shedd, James F.; Yett, Keith S.; and Kolve, Harold A., 3,875,552.

Kominami, Naoya: *See—*
Iwaisako, Toshyyuki; Ohki, Kusuo; Kominami, Naoya; and Yomogida, Hisao, 3,875,048.
Tamura, Nobuhiro; Suga, Kazuo; and Kominami, Naoya, 3,875,020.

Komiya, Takao: *See—*
Negishi, Hirokazu; Saito, Takashi; Komiya, Takao; Masaki, Tatsuo; and Ihara, Takashi, 3,874,942.

Kondo, Kyozo; and Okimoto, Takeyoshi, to Mitsubishi Jukogyo Kabushiki Kaisha. Conveyors. 3,874,297, Cl. 104-25.000.

Konishi, Seizo: *See—*
Ohkawa, Masaaki; Konishi, Seizo; Abeta, Sadaharu; and Okaniwa, Tetuo, 3,874,847.

Konishi, Shuichi: *See—*
Kato, Yasuyuki; Moritani, Masahiko; Konishi, Shuichi; and Tatsukami, Yoshiharu, 3,875,255.

Kopec, Thomas J.; and Morstadt, Richard A., to GTE Automatic Electric Laboratories Incorporated. Common audible signaling circuit. 3,875,348, Cl. 179-84.00R.

Koppensteiner, Gunter; Eckert, Hans-Werner; and Wehle, Volker, to Hendel & Cie GmbH. Antimicrobial agents for water conservation. 3,874,869, Cl. 71-67.000.

Korb, Charles R., Jr.; and Boning, John F. Bicycle brake caliper adjusting tool. 3,874,256, Cl. 81-3.00R.

Korolkevich, Alexandr Viktorovich: *See—*
Lapitsky, Igor Nikolaevich; Sabadakh, Bogdan Vasilievich; Sumtsov, Gennady Grigorievich; Xenevich, Ivan Pavlovich; Skoibeda, Anatoly Tikhonovich; Venzel, Leonid Isaakovich; Tolstoguzov, Viktor Sergeevich; Shneiser, Boris Yakovlevich; and Korolkevich, Alexandr Viktorovich, 3,874,251.

Korshunov, Evgeny Alexeevich; Samoilovich, Jury Avramovich; Kostrov, Valery Pavlovich; Aragilian, Oleg Ashotovich; Goryainov, Vladimir Alexeevich; and Tarasov, Anatoly Grigorievich. Device for cooling the crystallizer in a plant for casting metal ingots with a periodic discharge thereof. 3,874,439, Cl. 164-283.00M.

Kortz, George B.: *See—*
Anderson, Paul E.; Cunningham, William W.; and Kortz, George B., 3,874,736.

Kosmanski, Thomas J., to General Motors Corporation. Rotary engine apex seal and spring injector. 3,874,059, Cl. 29-235.000.

Kosmider, Jerome: *See—*
Klugman, Warren L.; and Kosmider, Jerome, 3,874,858.

Kossel, Dierick, to Ernst Leitz GmbH. Apparatus for detecting liquid pollution in a transparent container. 3,874,800, Cl. 356-208.000.

Kosswig, Kurt: *See—*
von Praun, Ferdinand; and Kosswig, Kurt, 3,875,070.

Kostrov, Valery Pavlovich: *See—*
Korshunov, Evgeny Alexeevich; Samoilovich, Jury Avramovich; Kostrov, Valery Pavlovich; Aragilian, Oleg Ashotovich; Goryainov, Vladimir Alexeevich; and Tarasov, Anatoly Grigorievich, 3,874,439.

Kotler, Gerald R.: *See—*
Gallagher, Peter Christopher John; and Kotler, Gerald R., 3,874,667.

Kotzias, George Anthony: *See—*
Anderson, Charles Victor; Fleming, Mills Lawrence; Kotzias, George Anthony; Ross, Robert Rogers; and Williams, James Luchin, 3,875,325.

Kou, Jean. Road vehicle of the platform type. 3,874,537, Cl. 214-501.000.

Kouklik, Ivo; and Lorenc, Jaroslav, to Elitex, Zavody textilniho strojirenstvi generalni reditalstvi. Apparatus for regulating pulsatory operation of an electromagnet in a circular knitting machine. 3,874,198, Cl. 66-50.00R.

Kovacs, Gabor: *See—*
Stadler, Istvan; Kovacs, Gabor; Meszaros, Zoltan; Radoczi, Julia; Simonidesz, Vilmos; Szantay, Csaba; Szekely, Istvan; and Szathmary, Csaba, 3,875,003.

Kovarik, Vincent J. Sewage treatment system. 3,875,051, Cl. 210-2.000.

Kowalczyk, Zygmunt. Crowned cover. 3,874,542, Cl. 215-328.000.

Kozak, Theodore F., to Union Carbide Corporation. Pressure-sensitive tape fastener for disposable diapers. 3,874,386, Cl. 128-287.000.

Kral, Jan; Kerlin, Kurt; Gratza, Heldemar; and Harazim, Alfons, to Moravskoslezska armaturka, narodni podnik. Drive apparatus for rotary spindles. 3,874,245, Cl. 74-89.150.

Kramer, David A.: *See—*
Hill, Richard M.; Kramer, David A.; and Makino, Roy H., 3,875,569.

Kramer, David Chester: *See—*
Scuitto, Thomas John; and Kramer, David Chester, 3,875,375.

Krause, Martin C., to Van-Air Incorporated. Automatic drain device for deliquescent gas dryers. 3,874,859, Cl. 55-218.000.

Krebs, Klaus-Werner: *See—*
Eicher, Theo; Muller, Friedemann; and Krebs, Klaus-Werner, 3,874,390.

Kreeger, Elsmer W.: *See—*
Sanders, Ellsworth E.; and Kreeger, Elsmer W., 3,874,546.

Krehbiel, Delmar D.: *See—*
Clark, Charles R.; Gregory, M. Duane; Kerfoot, Oliver C.; Veatch, Fred C.; Krehbiel, Delmar D.; and Kennedy, Carl D., 3,874,454.

Kreis, Walter; and Trosch, Paul, to Georg Fischer AG. Separable valve cock and separable structure therefor. 3,874,633, Cl. 251-214.000.

Krivda, Alfred. Power device for collecting material from crevices for pan separation. 3,874,732, Cl. 299-7.000.

Kroll, Harry; and Therrien, Alderic R., to Philip A. Hunt Chemical Corporation. Alcoholates of orthophosphate salts of 4-amino, 3-methyl, N-ethyl, N-beta methanesulfonamidoethyl aniline. 3,875,227, Cl. 260-556.00A.

Krull, Irwin H., to Beckman Instruments, Inc. Electrode structure. 3,875,037, Cl. 204-195.00P.

Kruse, Walter M., to Hercules Incorporated. Tetraalkylchromium compounds and use as olefin polymerization catalysts. 3,875,132, Cl. 260-93.700.

Kruzell, George R. Ammunition feed and bolt lock mechanism for a closed breech rocket gun. 3,874,265, Cl. 89-1.801.

Kubota, Koji; Kamijo, Hirotaka; Mihara, Osamu; Okumura, Shinji; and Okada, Hiroshi, to Ajinomoto Co., Inc. Fermentative production of L-histidine. 3,875,001, Cl. 195-29.000.

Kudo, Yasushi: *See—*
Nakano, Toshio; and Kudo, Yasushi, 3,875,333.

Kukumura, Mikio: *See—*
Hayashi, Motoshige; Kukumura, Mikio; and Sano, Zengo, 3,874,981.

Kumamaru, Hiroyuki: *See—*
Tsukamoto, Akiyoshi; Kumamaru, Hiroyuki; Matsuno, Koichiro; and Ishikawa, Mahito, 3,874,076.

Kumano, Hiroshi: *See—*
Sonetaka, Kazunori; Nishino, Atsushi; and Kumano, Hiroshi, 3,874,277.

Kunert, Heinz-Peter, to U. S. Philips Corporation. X-ray apparatus. 3,875,411, Cl. 250-402.000.

Kunzer, Heinz, to Bochumer Eisenhutte Heintzman & Company. Support for mine roofs and the like. 3,874,178, Cl. 61-45.00D.

Kunzinger, Frederick Francis; and Suiter, Weyman Blanchard, Jr., to Bell Telephone Laboratories, Incorporated. Ferroresonant power converter with control of inverter frequency and sensing of saturation condition. 3,875,493, Cl. 321-18.000.

Kupchan, S. Morris; and Liepa, Andris J., to Research Corporation. Synthesis of thalicarpine. 3,875,167, Cl. 260-289.00A.

Kupelian, Robert Howard, to American Cyanamid Company. Process for increasing sugar yield in sugar cane. 3,874,872, Cl. 71-86.000.

Kupplungstechnik GmbH: *See—*
Symann, Heinz-Georg, 3,874,195.

Kuraray Co., Ltd.: *See—*
Inoue, Taisei, 3,875,302.

Kureba Kagaku Kogyo Kabushiki Kaisha: *See—*
Uchikawa, Shoji, 3,875,433.

Kurikami, Toshio, to Toho Aen Kabushiki Kaisha. Removing mercury from concentrated sulfuric acid using iodides. 3,875,287, Cl. 423-101.000.

Kuroda, Hiroki: *See—*
Suzuki, Kikuji; Kuroda, Hiroki; and Nabeta, Saburo, 3,875,217.

Kurpanek, Waldemar Helmut. Pulsatile magneto-motive artificial heart. 3,874,002, Cl. 3-1.000.

Kurth, Hans-Joachim; Rauch, Hubert; Rossberg, Peter; and Elser, Wilhelm, to Rohm GmbH. Free radical emulsion polymerization involving novel incremental addition of acrylic monomers to prepare high viscosity, freeze-thaw stable dispersions. 3,875,099, Cl. 260-29.6TA.

Kurz, Arthur W., Jr., to Donnelly Mirrors, Inc. Mirror case with expansion-absorbing means. 3,874,773, Cl. 350-288.000.

Kurz, Fredrik Wilhelm Anton. Method of producing foamed glass. 3,874,861, Cl. 65-20.000.

Kuzentsov, Viktor Georgievich: *See—*
Lyass, Abram Moiseevich; Borsuk, Pavel Afanasievich; Usubov, Zokhrab Gamid Ogly; and Kuzentsov, Viktor Georgievich, 3,874,885.

Kwantes, Arien: *See—*
Stouthamer, Bernhard; and Kwantes, Arien, 3,875,239.

Kwik-Out Manufacturing Company: *See—*
Thrash, Tommy K., 3,874,457.

Kwon, Young D.; Butler, Russell H.; Oswald, Hendrikus J.; and Kim, Dong W., to Allied Chemical Corporation. Apparatus and process for simultaneous crimping and commingling of yarns. 3,874,044, Cl. 28-1.300.

Kwon, Young D.: *See—*
Butler, Russell H.; Oswald, Hendrikus J.; and Kwon, Young D., 3,874,045.

La Cellophane: *See—*
Weber, Guy Paul, 3,874,789.

Lachmann, Burkhard: *See—*
Margotte, Dieter; Lachmann, Burkhard; Vernaleken, Hugo; Rudolph, Hans; and Cohnen, Wolfgang, 3,875,123.

Lacto Products Co., Inc.: *See—*
Storrs, Arnold B., 3,875,305.

Ladd, Harry A.; and Schenck, Frederick L. Pipeline leak detector. 3,874,222, Cl. 73-40.50R.

LaFarge, Kenneth K., to Raymond Lee Organization, Inc., The, a part interest. Combined funnel and container device. 3,874,429, Cl. 141-98.000.

Lagain, Georges. Apparatus for cutting and welding thermoplastics materials. 3,874,975, Cl. 156-515.000.

Lagneaux, Jean; and Vermeerbergen, Leon Roger, to Saint-Gobain Industries. Bottle stopper. 3,874,541, Cl. 215-253.000.

Lambert, Jules. Self-unloading ground vehicle. 3,874,526, Cl. 214-38.0CA.

Laminex, Inc.: *See—*
Hannon, Donald F., 3,874,979.

Lampert, Fred: *See—*
Hofel, Heinz-Bernhard; Kiessling, Hans-Joachim; and Lampert, Fred, 3,875,089.

Lamson Industries Limited: *See—*
McKellar, John Forgie; and Warburton, Geoffrey Greenwood, 3,874,884.

Lanahan, John H., to GAF Corporation. Cartridge card tray. 3,874,507, Cl. 209-80.500.

Lancer Boss Limited: *See—*
Staley, David Robert, 3,874,539.

Land, Edwin H., to Polaroid Corporation. Photographic film assemblage with resilient pad under processing solution container. 3,874,875, Cl. 96-76.00C.

Landfried, Bert W.: *See—*
Moneymaker, John R.; and Landfried, Bert W., 3,875,315.

Landi, Silvio; and Gupta, Krishana Chandara, to Connaught Laboratories Limited. Highly specific tuberculin. 3,875,002, Cl. 195-29.000.

Landwoski, Edmund A. Basement wall construction. 3,874,139, Cl. 52-251.000.

Lange, Emroy W.: *See—*
Gary, Wardell; and Lange, Emroy W., 3,875,464.

Langenstein & Schemann Aktiengesellschaft: *See—*
Bachmann, Horst, 3,874,218.

Langford, Frederic E.: *See—*
Raven, James R.; and Langford, Frederic E., 3,874,517.

Langley, John A., to Outboard Marine Corporation. Mounting assembly for small outboard motors. 3,874,318, Cl. 115-17.000.

Langlie, Howard; and Berg, Albert T., Jr. Wire or rope tightener. 3,874,638, Cl. 254-51.000.

Lanner, Christer, to AB Garphytte Bruk. Preparation of compound wire. 3,874,066, Cl. 29-470.100.

Lansdale, Alan, to Mather & Platt Limited. Filling devices. 3,874,430, Cl. 141-116.000.

Lanser, Robert. Internal pipe clamp. 3,874,681, Cl. 279-2.00R.

Lapham, Julie A.: *See—*
Koch, Paul J.; Pearce, Eli M.; and Lapham, Julie A., 3,875,108.

Lapitsky, Igor Nikolaevich; Sabadakh, Bogdan Vasilievich; Sumtsov, Gennady Grigorievich; Xenevich, Ivan Pavlovich; Skoibeda, Anatoly Tikhonovich; Venzel, Leonid Isaakovich; Tolstoguzov, Viktor Sergeevich; Shneiser, Boris Yakovlevich; and Korolkevich, Alexandr Viktorovich. Bevel gear differential. 3,874,251, Cl. 74-713.000.

Laporte Industries Limited: *See—*
Robinson, Michael; Clamp, Frank; Aberdeen, David; Mobbs, David Barry; and Pearse, Richard Vyvian, 3,875,286.

Larkin, Sam, to Spring Associates, Inc. Spring base and method of forming same. 3,874,423, Cl. 140-3.0CA.

Larsen, Gregory J., to FMC Corporation. Powered vehicular implement steering trailer. 3,874,691, Cl. 280-87.100.

Larson, Irving R. Bale unroller. 3,874,609, Cl. 242-86.50R.

Larson, Raymond D. Downrigger line release. 3,874,110, Cl. 43-43.120.

Larsson, Bertil Sven Vilhelm, to Aktiebolaget Svenska Flaktfabriken. Apparatus for separating particulate matter from a flowing medium. 3,874,860, Cl. 55-244.000.

Lattuca, Joseph S.: *See—*
Saunders, George T.; Lattuca, Joseph S.; and Richards, Dorman C., 3,874,754.

Laurent, Henry; and Wiechert, Rudolf, to Schering Aktiengesellschaft. Process for the preparation of pregnanoic acid derivatives. 3,875,194, Cl. 260-397.100.

Laurent, Roger: *See—*
Orsini, Leon; Laurent, Roger; and Dessevre, Denis, 3,874,904.

La Vange, Donald H.; and Hazard, Robert E., to Polytop Corporation. Child resistant closure with cam mechanism. 3,874,568, Cl. 222-505.000.

Law, Ronald D., to Thiokol Corporation. Purification of tris[1-(2-methyl) aziridinyl]phosphine oxide. 3,875,145, Cl. 260-239.0EP.

Lawson, Clarence E. Snowmobile trailer. 3,874,683, Cl. 280-10.000.
Lawson, Edward L. Headlight warming system for vehicles. 3,875,557, Cl. 340-52.00D.
Lazarus, Harry J. Spectacle frame with temples angularly adjustable while spectacle frame is worn on head. 3,874,775, Cl. 351-41.000.
Lazzaro, Vito C., to McDonnell Douglas Corporation. Ablation compositions and coatings. 3,875,106, Cl. 260-37.0EP.
Le Voy's, Inc.: *See—*
Pannier, Karl A., Jr.; Reynolds, Gordon S.; and Sorenson, James L., 3,874,369.
Lea, Hans, to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler. Handling working pieces in liquids in dental technology. 3,874,395, Cl. 134-135.000.
Leach Company: *See—*
Gollnick, Cyril R., 3,874,529.
Lebailly, Jacques, to U.S. Philips Corporation. Polychromatic electroluminescent device. 3,875,473, Cl. 315-169.0TV.
Le Blanc, Richard E.; and Delettrez, Bernard F., to Beckman Instruments Inc. Arrangement for selectively determining rate of integration of an applied oscillatory signal by selecting the proportion of each signal cycle during which integration takes place. 3,875,428, Cl. 307-229.000.
LeBoeuf, Lamb, Leiby & MacRae: *See—*
McFadden, Daniel G.; and Levine, Richard C., 3,875,389.
Le Bon, Alain. Insert for ultrasonic medical device. 3,874,372, Cl. 128-24.00A.
Lectron Products, Inc.: *See—*
Quantz, Norman G., 3,874,474.
Lednicer, Daniel, to Upjohn Company, The. Compounds and process for preparing the same. 3,875,242, Cl. 260-613.00R.
Lee, Arthur L.; and Coval, Arthur B., to FMC Corporation. Articulated haulage vehicle. 3,874,698, Cl. 280-408.000.
Lee Company, The: *See—*
Lee, Leighton, II, 3,874,409.
Lee, Leighton, II, to Lee Company, The. Selector valve. 3,874,409, Cl. 137-599.200.
Lee-Norse, Company: *See—*
Delli-Gatti, Frank A., Jr., 3,874,735.
Leeds, Donald H., to Ducommun Incorporated. Porous composite of abrasive particle in a pyrolytic carbon matrix and the method of making it. 3,874,856, Cl. 51-296.000.
Lefeovre, Gerard; and Rollet, Bernard, to Rhone-Poulenc S.A. Thermosetting compositions derived from an epoxy resin, a polyamine and an imide. 3,875,113, Cl. 260-47.0EN.
Legrand, Robert, to Cegedur GP. Composite shock resisting bodies. 3,874,855, Cl. 29-191.200.
Lehigh Press, Inc., The: *See—*
Braber, Robert J., 3,874,143.
Lehman, Herbert S., to International Business Machines Corporation. Oxidation resistant mask layer and process for producing recessed oxide region in a silicon body. 3,874,919, Cl. 117-212.000.
Leigh, Theodore M., to FMC Corporation. Counterweight jack mechanisms for cranes and the like. 3,874,515, Cl. 212-49.000.
Leimgruber, Willy: *See—*
Berger, Leo; Leimgruber, Willy; and Schenker, Fausto Eugenio, 3,875,219.
Mohacsi, Ernest; and Leimgruber, Willy, 3,875,209.
Lemelson, Jerome H. Extrusion apparatus. 3,874,207, Cl. 72-56.000.
Lemelson, Jerome H. Method for molding composite bodies. 3,875,275, Cl. 264-45.300.
Lemond, Donald E.: *See—*
Lemond, Robert H.; and Lemond, Donald E., 3,874,340.
Lemond, Robert H.; and Lemond, Donald E. Aquarium tank feed system. 3,874,340, Cl. 119-51.00R.
Leon, Raymond R.: *See—*
Hicks, Charles L.; and Leon, Raymond R., 3,874,463.
L'Eplattenier, Francois; Pugin, Andre; and Vuitel, Laurent, to Ciba-Geigy Corp. New bis-2-azomethine pigments, process for their manufacture and their use. 3,875,200, Cl. 260-439.00R.
Lesher, George Y.; and Brundage, R. Pauline, to Sterling Drug Inc. Preparation of 1-alkyl-1,4-dihydro-7-substituted-4-oxo-1,8-naphthyridine-3-carboxylic acids via the 3-acetyl analogs. 3,875,172, Cl. 260-295.50B.
Leslie, Victor Jeffrey, to Imperial Chemical Industries Limited. Polysulphone polymer solution. 3,875,103, Cl. 260-30.8DS.
L'Etat Francais Delegation Ministerielle pour l'Armement Direction Technique des Armements Terrestres: *See—*
Faure, Jean-Jacques, 3,874,491.
Le Vantine, Allan D.: *See—*
Stader, Kenneth P.; and Le Vantine, Allan D., 3,874,371.
Levecque, Marcel; and Battigelli, Jean A., to Saint-Gobain Industries. Fiber toration; method, equipment and product. 3,874,886, Cl. 106-50.000.
Lever Brothers Company: *See—*
Higgs, Cyril Edward, 3,874,571.
Levine, Richard C.: *See—*
McFadden, Daniel G.; and Levine, Richard C., 3,875,389.
Levis, William W., Jr.: *See—*
Patton, John T., Jr.; Pizzini, Louis C.; Levis, William W., Jr.; and Merkl, Bernard A., 3,875,258.
Levitt, Barry N.: *See—*
Crocker, Thomas H.; and Levitt, Barry N., 3,875,488.
Levy, Leon B., to Celanese Corporation. Catalyst for oxidation of olefins. 3,875,078, Cl. 252-432.000.
Levy, Stanley S., to N L Industries, Inc. Impact and abrasion resistant coating composition. 3,875,090, Cl. 260-22.0TN.
Lewis, Geoffrey Arthur, to Lucas Aerospace Limited. Fuel control apparatus for gas turbine engine reheat systems. 3,874,170, Cl. 60-241.000.
Lewis, J. Stephen: *See—*
Sapkus, Jurgis; Lewis, J. Stephen; Ruppel, Kurt; and Benson, John T., 3,874,112.
Ley, Kurt: *See—*
Oertel, Harald; Roos, Ernst; and Ley, Kurt, 3,875,246.
Libbey-Owens-Ford Company: *See—*
Mochon, Casmir F.; Poley, Joseph E.; and Shamp, Donald E., 3,874,863.
Licentia Patent-Verwaltungs-G.m.b.H: *See—*
Pohl, Franz A.; Bohm, Harald; and Heffler, Joachim, 3,874,930.
LICENTIA Patent-Verwaltungs-GmbH: *See—*
Schioberg, Eva-Maria, 3,875,541.
Liddell, Harold G., to Dow Chemical Company, The. Composition and method for maintaining a constant concentration of agents and amount of solvent in a wood treating process. 3,874,908, Cl. 117-102.00R.
Liebergott, Norman, to Pulp and Paper Research Institute of Canada. Press alkaline extraction of cellulosic pulp. 3,874,992, Cl. 162-66.000.
Liebscher, Jonannes, to Liefheit International Gunter Leifheit KG. Sweeper. 3,874,016, Cl. 15-42.000.
Liedtke, Christa: *See—*
Hein, Hilmar; Janzon, Karlneinz; Weigert, Wolfgang; Liedtke, Christa; and Muller, Rudolf, 3,875,186.
Liefheit International Gunter Leifheit KG: *See—*
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Lim, Drahoslav; Kolinsky, Miloslav; and Jisova, Vaciava, to Ceskaslovenska Akademi Ved. Process for producing heat-stable polyvinyl chloride. 3,875,131, Cl. 260-92.80R.
Lin, Paul T.: *See—*
Chappelow, Ronald E.; Doulin, Joseph, Jr.; Lin, Paul T.; and Sarkary, Homi G., 3,874,920.
Lincoln Brass Works, Inc.: *See—*
Ferlin, William J., 3,874,841.
Lind, J. Henric, to Pdypur Forsaijnings AB. Sludge separator. 3,875,066, Cl. 210-521.000.
Linde Aktiengesellschaft: *See—*
Etzbach, Volker, 3,874,185.
Lindemann, Martin K., to Chas S. Tanner Co. Thermosetting vinyl or vinylidene halide emulsion copolymers. 3,875,100, Cl. 260-29.6TA.
Linder, Ernst: *See—*
Schmidt, Peter; Kizler, Harald; Maisch, Wolfgang; Peter, Bernd; Wahl, Josef; Linder, Ernst; and Neidhard, Horst, 3,874,171.
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List, Hans: *See—*
List, Hans; and Schreiber, Erich (said Erich Schreiber assors. to), 3,874,357.
List, Karl-Hermann: *See—*
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Litchford, George B., to Litchstreet Co. Adaptive proximity indicating system. 3,875,570, Cl. 343-6.5LC.
Litchstreet Co.: *See—*
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Little, Julian R.; Nudenberg, Walter; and Rim, Yong S., to Uniroyal, Inc. 1,4-Methano-hexahalo-octahydronaphthalene-5,8-dione alkylthio ethers. 3,875,236, Cl. 260-586.00G.
Little, Keith W.: *See—*
Millar, Barry C.; and Little, Keith W., 3,874,048.
Livesay, William R.; and Wing, Malcolm E., to Radiant Energy Systems, Inc. Mask alignment system for electron beam pattern generator. 3,874,916, Cl. 117-211.000.
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Waight, William J.; Williams, John A.; Garday, Louis C., deceased; and Garday, Johnnie A., legal representative, 3,874,404.
Lockie, David John Deverill, to Salartron Electric Group Limited, The. Transducers. 3,874,221, Cl. 73-30.000.
Lodal Inc.: *See—*
Brisson, John R., 3,874,534.
Lofts, Peter Frederick; Elves, John; and Brown, Peter. Method for making a nonwoven fabric. 3,874,913, Cl. 177-140.00R.
Lohr, Raymond J.; Cook, Calvin S.; Goodwin, Paul G.; and Merl, Carl J., to Louis Marx Co., Inc. Toy vehicle construction. 3,874,700, Cl. 280-240.000.
Lohse, Hartwig, to Siemens Aktiengesellschaft. Method for the production of an inductive component element. 3,874,075, Cl. 29-602.000.
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Loncin, Marcel, to Granimar A.G. Process for extracting sugar from sugar-containing plants. 3,874,925, Cl. 127-44.000.
London, Herbert S.; and Seay, William Jackson. Nonspill flexible package for shipping and storing cut flowers or the like. 3,874,115, Cl. 47-34.110.

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Bickling, Archie L., Jr.; Brown, Richard E.; Roller, Kent G.; and Loran, Thomas J., 3,874,862.
Lorenc, Jaroslav: *See—*
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Lorenian, Eugenia: *See—*
Lorenian, Zareh; and Lorenian, Eugenia, 3,874,643.
Lorenian, Zareh; and Lorenian, Eugenia. Method and apparatus for plasticizing and mixing materials under high pressure. 3,874,643, Cl. 259-185.000.
Lorenz, Heiss, to Hoechst Aktiengesellschaft. Amido-methyl-polyglycol formals. 3,875,197, Cl. 260-404.000.
Lorenz Kesting: *See—*
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Lorenz, Otto, to Orenstein & Koppel AG. Cross jet rudder for watercraft. 3,874,316, Cl. 114-151.000.
Louis Marx Co., Inc.: *See—*
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Love, Roy E., to Corning Glass Works. Coupler for optical communication system. 3,874,780, Cl. 350-96.0WG.
Lovens Kemiske Fabrik Producktionsaktieselskab: *See—*
Feit, Peter Werner; and Neilsen, Ole Bent Tvaermose, 3,875,150.
Lowe, Keith B.; and Gray, William R., to Allis-Chalmers Corporation. Hammer locking arrangement for impact crusher rotor. 3,874,603, Cl. 241-191.000.
Lowery, Patrick A.; and Egger, Richard L., to Boeing Company, The. Vacuum-applied heating pad. 3,875,373, Cl. 219-526.000.
Lowther, Frank E., to Purification Sciences, Inc. Solid state frequency converter for corona generator. 3,875,035, Cl. 204-176.000.
Lucas Aerospace Limited: *See—*
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Lewis, Geoffrey Arthur, 3,874,170.
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Onori, Bruno; and Luck, Meredith, 3,874,479.
Ludlam, David C. Layout device. 3,874,086, Cl. 33-189.000.
Ludwig, Lawrence P.; and Hady, William F., to United States of America, America as represented by the National Aeronautics and Space Administration. High speed, self-acting shaft seal. 3,874,677, Cl. 277-27.000.
Ludwig Taprogge (Cleaning Installations for Pipe Heating Exchanger): *See—*
Treplin, Friedrich-Wilhelm; Eimer, Klaus; and Thal, Heinz, 3,875,063.
Luger, Paul P., to Pioneer Educational Society, The. Radiation detector using a digital electrometer scaler. 3,875,410, Cl. 250-374.000.
Lund, Jorgen Aage Preben: *See—*
Sorensen, Soren Kai; Andersen, Jorgen; Johansen, Ebbe; and Lund, Jorgen Aage Preben, 3,874,850.
Lunden, Sidney L., to Moore-Iem, Inc. Stripping mechanism for lumber stackers. 3,874,521, Cl. 214-6.0DK.
Lundquist, Ingemar H.; and 104. Intravenous delivery pump. 3,874,826, Cl. 417-565.000.
Lunel, Jean: *See—*
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Lyass, Abram Moiseevich; Borsuk, Pavel Afanasievich; Usubov, Zokhrab Gamid Ogly; and Kuzentsov, Viktor Georgievich. Method of making foundry moulds and cores. 3,874,885, Cl. 106-38.350.
Lynwood A. Maddox: *See—*
Wooldridge, Bobby M., 3,874,353.
MacDonald, Robert D., to Cardinal of Adrian, Inc. Tubing fitting. 3,874,709, Cl. 285-104.000.
MacFarland, Charles H., to Scott & Fetzer Company, The. Double insulated vacuum cleaner motor housing. 3,875,436, Cl. 310-43.000.
MacFarland, Raymond, Jr., to Computron, Inc. Gripper jaw assembly. 3,874,976, Cl. 156-515.000.
MacFarlane, Iain Mackay, to Fiber Industries, Inc. Yarn process. 3,874,159, Cl. 57-157.0TS.
Mach, Joe A.: *See—*
Wagner, Lawrence R.; and Mach, Joe A., 3,874,640.
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Machida, Hazime; Tsurugi, Akira; and Okuno, Zenjiro, to Kabushiki Kaisha Ricoh. Reversible developer for electrostatic latent imaging method. 3,874,896, Cl. 117-37.0LE.
Mack, Alfred: *See—*
Hassan, Javathu K.; Mack, Alfred; and Wojtaszek, Michael R., 3,874,525.
Mackey, Walter J. Preparation of skeletal display of animals. 3,874,094, Cl. 35-20.000.
Mackie, William Denis Grenville, to James Mackie & Sons Limited. Carrier for weft insertion. 3,874,421, Cl. 139-122.00N.
MacLeod, Alastair Cameron. Latex for paper coating utilizing butadiene-styrene-acrylic acid-acrolein tetrapolymers. 3,875,101, Cl. 260-29.70T.
Madsen, Andrew, to Seatrek Ltd. Waterborne magnetic anomaly detection system and apparatus. 3,875,497, Cl. 324-3.000.
Maeder, Arthur: *See—*
Nachbur, Hermann; and Maeder, Arthur, 3,874,911.
Magee, Thomas A., to Diamond Shamrock Corporation. AC Ketoxime carbamates. 3,875,232, Cl. 260-566.000.
Magendans, Frederik; and Van Rheenen, Bernhard Josef Pieter, to U.S. Philips Corporation. Rotating x-ray anode having a target area made of a tungsten rhenium tantalum alloy. 3,875,444, Cl. 313-330.000.
Magnavox Company, The: *See—*
Burrus, Thomas W., 3,875,585.
Magne, Frank C.: *See—*
Mod, Robert R.; Magne, Frank C.; Sumrell, Gene; Novak, Arthur F.; and Solar, James M., 3,875,159.
Mahan, William A.; and Williams, Lester A., to D-Tex Electronics. Metal detector for distinguishing between precious metal objects and other metal objects. 3,875,498, Cl. 324-3.000.
Maio, Kenji; Watanabe, Shigeru; and Yokozawa, Norio, to Hitachi, Ltd. Hybrid computing apparatus of automatic connection type. 3,875,378, Cl. 235-150.500.
Maiorino, Giuseppe, to FMI-Mecfond-Aziende Mecchaniche Riunite S.p.A. Apparatus for simultaneously tapering and flanging the bodies of cylindrical metal cans. 3,874,209, Cl. 72-91.000.
Maisack, Herbert; Mueller, Albrecht; and Romberg, Helmut, to BASF Aktiegesellschaft. Process for making salts of 3-isopropyl-2,1,3-benzothiadiazin-(4)-one-2,2-dioxide. 3,875,155, Cl. 260-243.00R.
Maisch, Wolfgang: *See—*
Schmidt, Peter; Kizler, Harald; Maisch, Wolfgang; Peter, Bernd; Wahl, Josef; Linder, Ernst; and Neidhard, Horst, 3,874,171.
Maison, Jean-Marc, to Rhone-Poulenc S.A. Process for the manufacture of bis(benzot hiazylsulphene)amides. 3,875,177, Cl. 260-306.60A.
Makino, Roy H.: *See—*
Hill, Richard M.; Kramer, David A.; and Makino, Roy H., 3,875,569.
Malik, Stanislaus. Method for producing girders. 3,874,051, Cl. 29-155.00R.
Manautou, Jorge Martinez; and Garcia, Adolfo Rosado, to Alza Corporation. Article for detecting the fertile period and method for using same. 3,875,013, Cl. 195-103.50R.
Mancar-Trust: *See—*
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Mancy, Denise; Florent, Jean; and Preud'Homme, Jean, to Rhone-Poulenc S.A. Process for the preparation of daunorubicin. 3,875,010, Cl. 195-80.00R.
Mancy, Denise: *See—*
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Belloc, Andre; Florent, Jean; Mancy, Denise; and Verrier, Jean, 3,875,006.
Mandel, Alan F.: *See—*
Booker, Clyde A., Jr.; and Mandel, Alan F., 3,875,554.
Mandish, John Jerome, to Jazina, John. Tape transport arrangement for cassettes with interlocks to prevent tape damage. 3,875,590, Cl. 360-96.000.
Mangin, Pierre: *See—*
Durand, Daniel; and Mangin, Pierre, 3,875,076.
Maniak, Dominic J., to Pillsbury Company, The. Gas suspended bearing. 3,874,749, Cl. 308-9.000.
Mannesmann Aktiengesellschaft: *See—*
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Manning, Robert B.; and Nippes, Ernest F., to Arthur D. Little, Inc. Soft iron shot. 3,874,295, Cl. 102-92.100.
Manoukian, Nubar S., to Coherent Radiation. Gaseous laser with improved means for supporting the discharge confining bore tube. 3,875,530, Cl. 331-94.50D.
Manoury, Jean: *See—*
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Mantell, Cornelius, Jr. Crankcase drain valve with attachment for disposable oil bags. 3,874,478, Cl. 184-1.500.
Marathon Oil Company: *See—*
Jones, Stanley C.; and Parson, Robert W., 3,874,451.
Marchal, Michel: *See—*
Picquendar, Jean Edgar; Duda, Eugene; and Marchal, Michel, 3,875,024.
Marchello, John L. Bicycle seat. 3,874,730, Cl. 297-452.000.
Mardach, Labib, to Sieradzki, Franz. Multistage switch assembly having radial contacts axially bridging successive printed circuit board contacts. 3,875,353, Cl. 200-8.00A.
Margetts, Hugh Grenville, to Girling Limited. Automatic adjuster for a shoe drum brake. 3,874,481, Cl. 188-79.5GT.
Margotte, Dieter; Lachmann, Burkhard; Vernaleken, Hugo; Rudolph, Hans; and Cohnen, Wolfgang, to Bayer Aktiengesellschaft. Polymers and copolymers based on alkenoyl-oxybenzylidene-malonic esters as UV-absorbers and plastics stabilized therewith. 3,875,123, Cl. 260-78.40E.
Margotte, Dieter: *See—*
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Marine Colloids, Inc.: *See—*
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Marino, Santino Paul: *See—*
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Marion, Thomas E.: *See—*
Carter, Paul H., deceased; Carter, Leona Marie Carter, personal representative; and Marion, Thomas E., 3,874,830.

Marrone, Benny S., to Raymond Lee Organization, Inc., The, a part interest. Baby stroller. 3,874,690, Cl. 280-47.390.

Martin, Edouard: *See—*
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Martin, Gerald; Baccus, James A.; and Gurman, Marvin. Manually propelled water craft. 3,874,319, Cl. 115-23.000.

Martin, Hugh R.: *See—*
Friedman, Sander B.; and Martin, Hugh R., 3,874,416.

Martin Marietta Aluminum Inc.: *See—*
Anderson, Paul E.; Cunningham, William W.; and Kortz, George B., 3,874,736.

Martin, Robert M., to Coors Porcelain Company. Hollow pellets and method for making same. 3,875,271, Cl. 264-43.000.

Martin, Robert M., to Coors Porcelain Company. Hollow pellets and method of making same. 3,875,272, Cl. 264-43.000.

Martin, Robert M., to Coors Porcelain Company. Hollow pellets and method of making same. 3,875,273, Cl. 264-43.000.

Martin, Stephen C.: *See—*
United States of America, National Aeronautics and Space Administration; Davies, William D. T.; and Martin, Stephen C., 3,875,394.

Martin Welding Inc.: *See—*
Struss, Leigh A., 3,874,545.

Marty, Artemas D. Compartmented case providing enlarged work supporting surface. 3,874,757, Cl. 312-240.000.

Maruyama, Isamu: *See—*
Yamamoto, Hisao; Inaba, Shigeho; Okamoto, Tadashi; Hirohashi, Toshiyuki; Ishizumi, Kikuo; Yamamoto, Michihiro; Maruyama, Isamu; Mori, Kazuo; Kobayashi, Tsuyoshi; and Izumi, Takahiro, 3,875,142.

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Marzocchi, Alfred; and Brown, Alfred Winsor, to Owens-Corning Fiberglas Corporation. Tire construction with improved reinforcement. 3,874,982, Cl. 161-93.000.

Masaki, Tatsuo: *See—*
Negishi, Hirokazu; Saito, Takashi; Komiya, Takao; Masaki, Tatsuo; and Ihara, Takashi, 3,874,942.

Maschino, Dale C., to General Motors Corporation. Electric fuel pump strainer stand-off. 3,875,059, Cl. 210-172.000.

Mase, Tohru: *See—*
Nosaka, Teizou; Mase, Tohru; Tsukiyama, Toshitaka; Ohashi, Keiichi; and Ito, Yasushi, 3,874,009.

Maselek, Joseph E.: *See—*
Hunt, David H.; Allain, Raymond J.; and Maselek, Joseph E., 3,874,857.

Maslow, Louis, to Metropolitan Wire Goods Corporation. Shelving with removable corner structures. 3,874,511, Cl. 211-153.000.

Massachusetts Institute of Technology: *See—*
Parkin, William J., 3,875,402.

Massengale, John T.: *See—*
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Massonne, Joachim: *See—*
Hellberg, Karl-Heinz; and Massonne, Joachim, 3,875,291.

Massy, Derek James Rowland; and Winterbottom, Kenneth, to Ciba-Geigy AG. Process for treating non-kerations material with a polythiol resin and an aminoplast and the product obtained. 3,874,848, Cl. 8-115.600.

Massy, Derek James Rowland: *See—*
Bridgland, Brian Edward; Massy, Derek James Rowland; and Stark, Bernard Peter, 3,875,109.

Mastrangelo, Sebastian Vito Rocco: *See—*
Harden, John Charles; Knupp, John Lawrence, Jr.; and Mastrangelo, Sebastian Vito Rocco, 3,875,434.

Masuda, Koichiro: *See—*
Yamada, Koichi; Ueki, Hiromi; Masuda, Koichiro; and Tasaka, Katsuhiko, 3,875,095.

Masuda, Masanori: *See—*
Aoki, Hiroshi; Shimotsuma, Sakae; Masuda, Masanori; Asai, Takeo; and Matsumoto, Hujio, 3,875,119.

Masuda, Naosuke, to Jidosha Kiki Kabushiki Kaisha. Fluid pressure regulator valve and safety valve assembly. 3,874,172, Cl. 60-403.000.

Masukawa, Shoichi: *See—*
Tashiro, Kijuro; Yokoyama, Masuzo; Kitagawa, Sadao; and Masukawa, Shoichi, 3,875,126.

Masuko, Hitoshi: *See—*
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Masuyama, Kenya: *See—*
Muto, Kiyoshi; Yamamoto, Yasuhisa; Toyoda, Yoshinori; Azemi, Shozo; Okano, Shigeru; Masuyama, Kenya; Aihara, Seitaro; Ito, Takao; Ogawa, Isamu; and Harada, Mitsumasa, 3,874,062.

Materials Technology Corporation: *See—*
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Mather & Platt Limited: *See—*
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Matsson, Bo: *See—*
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Matsuda, Mitsuhiro: *See—*
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Matsui, Shunji: *See—*
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Matsumoto, Hujio: *See—*
Aoki, Hiroshi; Shimotsuma, Sakae; Masuda, Masanori; Asai, Takeo; and Matsumoto, Hujio, 3,875,119.

Matsumoto, Ikyo; Nakagawa, Kanji; Matsuzaki, Meiki; and Horiuchi, Kenji, to Banyu Pharmaceutical Co., Ltd.; and Hiroyoshi, Hidaka. Pyridine bis (dithiocarbamate) derivatives. 3,875,170, Cl. 260-293.690.

Matsumoto, Shigeru, to Victor Company of Japan, Ltd. Device for temporarily stopping tape travel in cartridge type tape recorder. 3,874,577, Cl. 226-90.000.

Matsuno, Koichiro: *See—*
Tsukamoto, Akiyoshi; Kumamaru, Hiroyuki; Matsuno, Koichiro; and Ishikawa, Mahito, 3,874,076.

Matsushita Electric Industrial Company: *See—*
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Matsushita Electric Industrial Co., Ltd.: *See—*
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Matsuyama, Kiyoshi: *See—*
Morikawa, Minoru; Sonoda, Ryuichi; and Matsuyama, Kiyoshi, 3,875,134.

Matsuzaki, Akira; and Hamura, Terasu, to Kokusai Cable Ship Kabushiki Kaisha. Method for mutually connecting submarine coaxial cables of different outside diameters. 3,874,960, Cl. 156-49.000.

Matsuzaki, Meiki: *See—*
Matsumoto, Ikyo; Nakagawa, Kanji; Matsuzaki, Meiki; and Horiuchi, Kenji, 3,875,170.

Mattel, Inc.: *See—*
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Matthias, Heinz-Bernd: *See—*
Honold, Ernst; Matthias, Heinz-Bernd; and Florjancic, Dusan, 3,874,813.

Mattis, James J.: *See—*
Byler, William H.; and Mattis, James J., 3,875,449.

Matusek, Miroslav; Franz, Milan; and Rousar, Ivo, to Vyzkumny Ustav Anorganicke Chemie. Apparatus for decomposing amalgams. 3,875,039, Cl. 204-248.000.

Mauceri, Albert: *See—*
Mirarchi, Carl; and Mauceri, Albert, 3,874,505.

Mauch, Hans A.; Smith, Glendon C.; and Bennett, Richard, to United States of America, Government. Reading aid for the blind. 3,874,097, Cl. 35-35.00A.

May & Baker Limited: *See—*
Wooldridge, Kenneth Robert Harry; and Basil, Berkeley, 3,875,149.

May, Denis Ronald William, to J. E. Hanger & Company Limited. Symes ankle joint. 3,874,004, Cl. 3-33.000.

Mayberry, Brian: *See—*
Welch, Rolland; Springer, Robert; Mayberry, Brian; and Sheppard, Robert, 3,874,653.

Mayer & Cie.: *See—*
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Mayer, George E.: *See—*
Conner, Joseph R.; Mayer, George E.; and Shovlin, Thomas F., 3,874,281.

Mayer, Harald; and Berentzen, Hardo, to Theodor Groz & Sonne; and Ernst Beckert Nadelfabrik Commandit-Gesellschaft. Latch needle for knitting machines. 3,874,199, Cl. 66-121.000.

Mayer, John Donald: *See—*
Collins, Richard Clement; Mayer, John Donald; and Thompson, Bernard Britton, 3,874,619.

Mayer-Mader, Rudolf; and Boldt, Jurgen, to Bayer Aktiengesellschaft. Dialkoxyxanthogendisulphides. 3,875,201, Cl. 260-455.00B.

Mayo, William D. Cart and vehicular carrying system for the cart. 3,874,531, Cl. 214-130.00R.

Mazur, Robert H.: *See—*
Jones, David A.; and Mazur, Robert H., 3,875,137.

Mazur, Yehuda; and Rotman, Avner, to Yeda Research and Development Co., Ltd. Preparation of hydroxylated steroids. 3,875,193, Cl. 260-397.100.

Mazzeo, Charles F.: *See—*
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McAlister, Isaac N., to Georgia Marble Company, The. Pneumatic multi-station remote controlled switching station. 3,874,490, Cl. 193-23.000.

McBain, William L., to Amark Industries, Inc. Log loading contest. 3,874,661, Cl. 273-1.00R.

McCaully, Ronald J. Intermediates for the Synthesis of 1,4-benzodiazepin-2-ones. 3,875,213, Cl. 260-490.000.

McClean Anderson, Inc.: *See—*
McLarty, Jack Lowrie, 3,874,329.

McClendon, Robert L.: *See—*
Zaccardelli, Richard A.; McClendon, Robert L.; and Opatrny, Donald R., 3,874,808.

McClenning, Mary M. Collapsible hanger. 3,874,572, Cl. 223-94.000.

McClure, James D., to Shell Oil Company. Synthesis of aldehydes. 3,875,240, Cl. 260-604.0HF.

McClure, James H.: *See—*
Post, Robert C.; McCullough, Allen W.; and McClure, James H., 3,874,900.

McCormack, Michael D.: *See—*
Hegg, Thomas R.; and McCormack, Michael D., 3,874,755.

McCracken, Nathan John, to Polysar Limited-Polysar Limitee. Method and apparatus for drying polymeric materials. 3,874,090, Cl. 34-61.000.

McCulloch Corporation: *See—*
McCulloch, Robert P.; and Smith, Stephen H., 3,874,665.

McCulloch, Robert P.; and Smith, Stephen H., to McCulloch Corporation. Ball putting cup and method of ejecting ball from same. 3,874,665, Cl. 273-34.00A.

McCullough, Allen W.: *See—*
Post, Robert C.; McCullough, Allen W.; and McClure, James H., 3,874,900.

McCullough, Richard C. Positive locking hinge. 3,874,029, Cl. 16-144.000.

McDonnell Douglas Corporation: *See—*
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McElroy, David: *See—*
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McFadden, Daniel G.; and Levine, Richard C., to LeBoeuf, Lamb, Leiby & MacRae. Method and apparatus for automatic optimal layout of shapes to be cut from material. 3,875,389, Cl. 235-151.000.

McFeeley, Robert E. Two pointed nail and holder. 3,874,434, Cl. 145-30.00R.

McGann, Harold J.; Whalen, John F.; and Williams, Boyd K., to Sperry Rand Corporation. Mechanical counter system for altimetric displays. 3,874,587, Cl. 235-131.00R.

McGee, James Dwyer, to Electron Physics Limited. Cascade image intensifier tube with independently sealed sections. 3,875,440, Cl. 313-96.000.

McGinniss, Vincent D.: *See—*
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McGowen, Harold E., Jr., deceased (by McGowen, Wanda Elizabeth Lyles, executrix). Collet latch for releasably locking a flow control device in the pocket of a well mandrel. 3,874,447, Cl. 166-214.000.

McGowen, Harold E., Jr. deceased; and McGowen, Wanda Elizabeth Lyles, executrix. Latch for releasably locking a flow control device in the pocket of a well mandrel. 3,874,448, Cl. 166-215.000.

McGowen, Wanda Elizabeth Lyles, executrix: *See—*
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McInally, John A., to Xerox Corporation. Electrostatographic fusing process employing replaceable liner. 3,874,892, Cl. 117-6.000.

McInnes, Alan Don; and Bolton, Robert John, to A. C. Hatrick Chemicals Pty. Limited. Drying process and resultant product. 3,874,898, Cl. 117-62.000.

McKellar, John Forgie; and Warburton, Geoffrey Greenwood, to Lamson Industries Limited. Coating compositions. 3,874,884, Cl. 106-14.500.

McKinney, Lloyd J.; and Ferrin, Wayne W., to General Electric Company. Electrolytic machining apparatus. 3,875,038, Cl. 204-224.00M.

McLarty, Jack Lowrie, to McClean Anderson, Inc. Device for coating a strand with a binding material. 3,874,329, Cl. 118-125.000.

McNamara, John: *See—*
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McRai, John Bell: *See—*
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Medi-Physics, Inc.: *See—*
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Meguro, Takashi; Takashashi, Hironori; and Arai, Kazuko, to Ajinomoto Co., Inc. Process for preparing phosphoric acid esters of fatty acid mono- or di-glycerides. 3,875,196, Cl. 260-403.000.

Mehbert, Klaus; and Valenta, Guenter, to Rudolph Baresel-Bofinger. Chair. 3,874,727, Cl. 297-320.000.

Meinel, Erhard. Apparatus for treating filamentary material. 3,874,332, Cl. 118-264.000.

Meisert, Ernst; and Goyert, Wilhelm, to Bayer Aktiengesellschaft. Thermoplastic polyurethanes and a two-stage process for their preparation. 3,875,118, Cl. 260-75.0NP.

Mendelow, Robert; Schiff, Arthur; Silverman, Abraham; and Stopek, Benjamin, to Ideal Recreational Products, Inc. Swimming pool ledge structure. 3,874,132, Cl. 52-71.000.

Menzer, Anton: *See—*
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Merges, John C., Jr.: *See—*
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Merianos, John J.: *See—*
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Merkl, Bernard A.: *See—*
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Merklen, Kenneth E.: *See—*
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Merl, Carl J.: *See—*
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Merrill, Phillip Edward, to Micro Devices corp. Electrical switch construction and end plug therefor or the like. 3,875,546, Cl. 337-407.000.

Merrill, Richard E.: *See—*
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Messer Griesheim GmbH: *See—*
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Metagraphic Systems, Inc.: *See—*
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Metailler, Roger, to Societe dite: RICHIER. Excavators for digging trenches and the like. 3,874,532, Cl. 214-138.000.

Metallgesellschaft Aktiengesellschaft: *See—*
Reh, Lothar; Vydra, Karl; Doerr, Karl-Heinz; Grimm, Hugo; and Hennenberger, Karl-Heinz, 3,875,294.

Metalsky, William J.; and Reynolds, William A., to Abar Corporation. Control operator. 3,874,845, Cl. 432-266.000.

Metlesics, Werner; and Sternbach, Leo Henryk, to Hoffman-La Roche. Novel 2-benzoyl benzaldehyde compounds. 3,875,238, Cl. 260-591.000.

Metropolitan Wire Goods Corporation: *See—*
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Meyer, Erwin: *See—*
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Meyer, Gundolf, to BBC Brown Boveri & Company Limited. Method of fabricating a stabilized composite superconductor. 3,874,074, Cl. 29-599.000.

Meyer, Robert E.: *See—*
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Miale, Joseph N.: *See—*
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Michahelles, Michele. Transport apparatus. 3,874,308, Cl. 105-368.00R.

Michel, Lucien P., to Scadella Anstalt. Telescopic mast structure. 3,874,136, Cl. 52-115.000.

Mickelsen, Reid A., to Boeing Company, The. Tantalum thin film resistors by reactive evaporation. 3,874,922, Cl. 117-227.000.

Mickowski, John: *See—*
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Mihara, Nobutake; Furuya, Osamu; and Wada, Koichi, to Showa Denko Kabushiki Kaisha. Process for the commerical preparation of lower amino acids. 3,875,221, Cl. 260-534.00R.

Mihara, Osamu: *See—*
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Mikami, Toshitaka. Automatic material feeder for multispindle material working machine. 3,874,519, Cl. 214-1.200.

Miki, Masamichi: *See—*
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Miksitz, Alfred L.: *See—*
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Milianowicz, Stanislaw A.: *See—*
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Milkovic, Miran, to General Electric Company. Metering electrical energy (kWh) in single phase systems. 3,875,508, Cl. 324-142.000.

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Mill Master Onyx Corporation: *See—*
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Millar, Barry C.; and Little, Keith W., to Bundy Corporation. Method and apparatus for fabricating tubing. 3,874,048, Cl. 29-33.00K.

Miller, Charles G.: *See—*
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Miller, Henry F.; and Mishory, Jonathan, to Uniroyal, Inc. Capacitive weighing mat. 3,875,481, Cl. 317-246.000.

Miller, Robert L.; and Fisset, Louis M., to Ex-Cell-O Corporation. Tooth forming tool. 3,874,219, Cl. 72-469.000.

Miller, William J.: *See—*
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Mills, Noel L.: *See—*
King, Terry D.; and Mills, Noel L., 3,874,388.

Milne, David G., to du Pont de Nemours, E. I., and Company. Stabilized organosols through the inter-reaction of functional groups on the stabilizer and dispersed polymers. 3,875,262, Cl. 260-900.000.

Minagawa, Shigekazu: *See—*
Kano, Tsuyoshi; Saitoh, Tadashi; Suzuki, Atsushi; Suzuki, Teruki; Minagawa, Shigekazu; and Otomo, Yoshiro, 3,875,456.

Minami, Teruo, to Kabushiki Kaisha Komatsu Seisakusho. Hydraulic speed change control device. 3,874,255, Cl. 74-866.000.

Minet, Roger P.; Debeau, Jean H.; and Thepault, Ernest L. Microwave bandpass filter. 3,875,538, Cl. 333-73.00S.

Minnesota Mining and Manufacturing Company: *See—*
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Mirarchi, Carl; and Mauceri, Albert. Wall crevice repair kit. 3,874,505, Cl. 206-223.000.

Mirolli, Joseph E., to Hercules Incorporated. Cross-linking epihalohydrin polymers. 3,875,122, Cl. 260-78.40D.

Misawa Homes Institute of Research & Development: *See—*
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Miszenti, Giorgio Szabo; and Nannetti, Carlo Alberto, to Montecatini Edison S.p.A. Process for the preparation of porous membranes or composite barriers for gaseous diffusion installations. 3,874,899, Cl. 117-66.000.

Mitchell, Herman C.: *See—*
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Mitchell, Willard N., to Exxon Research and Engineering Company. Method and apparatus for the transfer of entrained solids. 3,874,739, Cl. 302-24.000.

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Mitsubishi Gas Chemical Company, Inc.: *See—*
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Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
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Mitzel, James W., to Tegal Corporation. Gaseous plasma reaction apparatus. 3,875,068, Cl. 250-531.000.

Miura, Masatugu: *See—*
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Miyamori, Hiroshi: *See—*
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Miyaoka, Senri, to Sony Corporation. Acute angle source of plural beams for color cathode ray tube. 3,875,446, Cl. 313-414.000.

Miyazaki, Ken; Terai, Toshitaka; Takahashi, Kazutoshi; and Sato, Hiroshi, to Asahi Kasei Kogyo Kabushiki Kaishia. Liquid detector. 3,874,223, Cl. 73-32.00R.

Miyoshi, Shoji: *See—*
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Mizusawa, Akira, to Nifco Inc. Device for removably holding a plate, such as a printed circuit board. 3,874,766, Cl. 339-125.00R.

Mobbs, David Barry: *See—*
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Holden, Morell J., Jr., 3,874,579.
White, Laniel B., 3,875,487.
Whitehurst, Darrell Duayne, 3,875,125.

Mocas, Verlin A., to Richardson Company, The. Method for casting battery terminals. 3,874,933, Cl. 136-135.00S.

Mochizuki, Toshio, to Asahi Kogaku Kogyo Kabushiki Kaisha,. Through-the-viewfinder light shading device. 3,875,579, Cl. 354-154.000.

Mochon, Casmir F.; Poley, Joseph E.; and Shamp, Donald E., to Libbey-Owens-Ford Company. Method for renewing a glass making operation coolant. 3,874,863, Cl. 65-27.000.

Mod, Robert R.; Magne, Frank C.; Sumrell, Gene; Novak, Arthur F.; and Solar, James M. 1,3-Diacyl derivatives of imidazolidine and hexahydropyrimidine. 3,875,159, Cl. 260-251.00R.

Modern Album and Finishing Co., Inc.: *See—*
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Molded Products Company: *See—*
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Moll, Ralph E. Mail receptacle. 3,874,583, Cl. 232-17.000.

Momoi, Toshimitu: *See—*
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Monaghan, James. Vehicle safety device. 3,874,476, Cl. 180-103.000.

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Montiglio, Ugo; and Basile, Giampiero, to Montecatini Edison S.p.A. Modified ferromagnetic chromium dioxide composition and method of preparing the same. 3,874,923, Cl. 117-235.000.

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Morgan, Harry C.; and Weis, Walter W., Jr. Method and apparatus for machining and/or polishing molded elastomer materials. 3,874,124, Cl. 51-125.000.

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Mori, Kazuo: *See—*
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Murakami, Shoetsu, to Yoshida Kogyo Kabushiki Kaisha. Cam-lock slider. 3,874,040, Cl. 24-205.14R.
Muramatsu, Mobuhiro; Aoki, Kosuke; and Miki, Masamichi, to Riken Lightmetal Industry Co., Ltd. Ceiling-mounted apparatus for providing a smoke vent or smokeproof screen in the event of a fire. 3,874,130, Cl. 52-1.000.
Murphy, Vivian G., to Raymond Lee Organization, Inc., The, a part interest. Wall aquarium. 3,874,336, Cl. 119-5.000.
Murray, Gerald Atlee. Rotary saw jig. 3,874,261, Cl. 83-471.300.
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Muskulus, Willi, to Balzer & Droll KG. Arrangement for winding of coils insertable into stators of electric machines. 3,874,424, Cl. 140-92.100.
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Nadas, Gyula; and Wosegien, Bernd, to Knorr-Bremse GmbH. Resetting device for brakes. 3,874,484, Cl. 188-197.000.
Nagano, Akira; Urasaki, Kazuaki; and Miura, Masatugu, to Omron Tateisi Electronics Co., Ltd. Digital serial arithmetic unit. 3,875,393, Cl. 235-176.000.
Nagel, Robert H., to IDR, Inc. Frame grabbing system. 3,875,329, Cl. 178-6.800.
Nagin, Tony, Jr.; and Nagin, Tony, Sr. Decelerating safety bumper for vehicles and the like. 3,874,718, Cl. 293-85.000.
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Nagin, Tony, Jr.; and Nagin, Tony, Sr., 3,874,718.
Nagorski, Witold; and Bieganski, Zdzislaw. Hydraulic pump. 3,874,821, Cl. 417-235.000.
Naiman, Samuel, to Visual Graphics Corporation. Shadow lettering system. 3,874,978, Cl. 161-6.000.
Naito, Buni; Sumi, Masao; Aoki, Kunihiro; and Hosoi, Jutaro, to Iwate Fuji Sangyo Kabushiki Kaisha. Unit furniture. 3,874,753, Cl. 312-111.000.
Nakagawa, Kanji: *See—*
Matsumoto, Ikyo; Nakagawa, Kanji; Matsuzaki, Meiki; and Horiuchi, Kenji, 3,875,170.
Nakamura, Tadashi. Electromagnetic plunger pump. 3,874,822, Cl. 417-311.000.
Nakamura, Takeshi, to Matsushita Electronics Corporation. Incandescent lamp. 3,875,443, Cl. 313-274.000.
Nakano, Toshio; and Kudo, Yasushi, to Hitachi, Ltd.; and Nippon Telegraph and Telephone Public Corporation. Method of eliminating errors of discrimination due to intersymbol interference and a device for using the method. 3,875,333, Cl. 178-88.000.
Nanai, Sadaaki: *See—*
Yagi, Takashi; Nanai, Sadaaki; Ouhara, Souji; and Shirakawa, Yukihiro, 3,875,468.
Nannetti, Carlo Alberto: *See—*
Miszenti, Giorgio Szabo; and Nannetti, Carlo Alberto, 3,874,899.
Naphtachimie: *See—*
Durand, Daniel; and Mangin, Pierre, 3,875,076.
National Can Corporation: *See—*
Patarini, Leon M.; Bronec, Joseph A.; and Zundel, Arthur P., 3,874,555.
National Research Development Corporation: *See—*
Cunningham, Sinclair Upton; Wells, James Rutherford; and Firth, Donald, 3,874,275.
Wingfield, Peter Maurice, deceased; and Warren, Roger Hill, 3,875,381.
National Steel Corporation: *See—*
Baker, James N., 3,874,333.
Nawata, Takanari: *See—*
Yonemitsu, Eiichi; Miyamori, Hiroshi; Nawata, Takanari; Takeda, Mutsuhiko; and Sasaki, Yukio, 3,875,223.
Naylor, Thomas K.: *See—*
Harris, George J.; and Naylor, Thomas K., 3,874,370.
Nechtow, Marshall I.; and Sandera, Jiri, to TRW Inc. Structure and process for semiconductor device using batch processing. 3,874,918, Cl. 117-212.000.
Nederlof, Anton Marie, to U.S. Philips Corporation. Method of manufacturing a radiator. 3,874,053, Cl. 29-157.30B.
Needs, Inc.: *See—*
Anshus, David S., 3,875,421.
Negishi, Hirokazu; Saito, Takashi; Komiya, Takao; Masaki, Tatsuo; and Ihara, Takashi, to Canon Kabushiki Kaisha. Electrophotographic photosensitive member. 3,874,942, Cl. 96-1.500.
Negishi, Takao: *See—*
Kitazawa, Shin-Ich; Negishi, Takao; and Susami, Kozo, 3,874,160.
Neidhard, Horst: *See—*
Schmidt, Peter; Kizler, Harald; Maisch, Wolfgang; Peter, Bernd; Wahl, Josef; Linder, Ernst; and Neidhard, Horst, 3,874,171.
Neilsen, Ole Bent Tvaermose: *See—*
Feit, Peter Werner; and Neilsen, Ole Bent Tvaermose, 3,875,150.
Nelson, Gunner E., to Ethyl Corporation. Preparation of haloalkyl aromatic hydrocarbons. 3,875,249, Cl. 260-651.0HA.
Nemcek, Josef: *See—*
Dart, Edward Charles; Perry, Antony Robert; and Nemcek, Josef, 3,874,376.
Neo-Dyne Industries, Inc.: *See—*
Feigel, Harold J., 3,874,144.
Neumaier, Peter, to Institut Dr. Friedrich Forster, Prufgeratebau. Coil arrangement and circuit for eddy current testing. 3,875,502, Cl. 324-37.000.
New Jersey Zinc Co., The: *See—*
Fulford, Emory Eugene, 3,874,466.
Newman, Douglas A., to Columbia Ribbon and Carbon Manufacturing Co., Inc. Pressure-sensitive transfer elements. 3,874,984, Cl. 161-117.000.
Neynaber Chemie GmbH: *See—*
Worschech, Kurt; Wolf, Kurt; and Kachel, Helmut, 3,875,069.
Nicholl, Thomas H. Display package. 3,874,500, Cl. 206-45.190.
Nicholl, Thomas H. Means for producing colored light. 3,875,397, Cl. 240-10.630.
Nickerson, John D.: *See—*
Wiesboeck, Robert A.; and Nickerson, John D., 3,875,292.

Nickolson, Robert C.; and Wiechert, Rudolf, to Schering Aktiengesellschaft. Reduction of 3-keto-5 beta-H steroids to 3 beta-hydroxy-5beta-H steroids. 3,875,195, Cl. 260-397.400.

Nicolon B.V.: *See—*
De Winter, Jan Gerrit, 3,874,177.

Niebojewski, Frank J. Exercise appartus including stall bars and exercise equipment mounted thereon. 3,874,657, Cl. 272-58.000.

Niederer, Kurt W., to W. Schlafhorst & Co. Knit fabric incorporating a fancy warp stitch weave. 3,874,201, Cl. 66-193.000.

Nielsen, Philip D. Electronic print exposure analyzer. 3,874,793, Cl. 355-68.000.

Nifco Inc.: *See—*
Mizusawa, Akira, 3,874,766.

Niki, Motohiro. Water dispenser for small animals. 3,874,343, Cl. 119-72.500.

Nippes, Ernest F.: *See—*
Manning, Robert B.; and Nippes, Ernest F., 3,874,295.

Nippon Hoso Kyokai: *See—*
Kato, Shigeo; Masuko, Hitoshi; and Kameyama, Yukio, 3,874,778.

Nippon Kogaku K.K.: *See—*
Kasai, Toshiyuki, 3,874,797.
Shimizu, Yoshiyuki, 3,874,770.

Nippon Seiko Kabushiki Kaisha: *See—*
Okubo, Kenji; Endo, Satour; and Oka, Shoji, 3,874,751.

Nippon Selfoc Company, Limited: *See—*
Kobayashi, Kohroh; and Ueki, Atsufumi, 3,875,532.

Nippon Telegraph and Telephone Public Corporation: *See—*
Nakano, Toshio; and Kudo, Yasushi, 3,875,333.

Nischk, Gunther: *See—*
Radlmann, Eduard; and Nischk, Gunther, 3,875,127.

Nishino, Atsushi: *See—*
Sonetaka, Kazunori; Nishino, Atsushi; and Kumano, Hiroshi, 3,874,277.

Nissan Motor Company Limited: *See—*
Abe, Fumiyuki; Oka, Takashi; Fukuda, Shigeo; Matsui, Shunji; Hirashima, Kenzo; and Hosaka, Akio, 3,874,695.
Katsume, Tetsuo; and Horiuchi, Toshihiro, 3,874,167.
Seki, Chichitada; and Hisatomi, Takashi, 3,875,267.

Nisshin Seiyu Kabushiki Kaisha: *See—*
Sakita, Takashi; Kanda, Hiroshi; and Yamagami, Yasumasa, 3,874,279.

Nixon, Walter B.: *See—*
Sweeney, Thomas E.; and Nixon, Walter B., 3,874,816.

Niznik, George E., to General Electric Co. Preparation of fluorenone. 3,875,237, Cl. 260-590.000.

NL Industries, Inc.: *See—*
Hoffman, George W.; Blankenship, H. Michael; and Granquist, William T., 3,875,288.

Noesges, Raymond: *See—*
Hansen, Robert N.; Hempel, George T.; and Noesges, Raymond, 3,874,625.

Noeske, Heinz; and Feichtinger, Hans, to Ruhrchemie Aktiengesellschaft. Process for the preparation of tertiary amines of high purity. 3,875,235, Cl. 260-585.00B.

Nofziger, Dale, to Ansonia Clock Company, Inc. Pendulum and escapement anchor relationship indicator and setter. 3,874,324, Cl. 116-124.00R.

Nogier, Louis; and Nogier, Paul. Sealing piston cap for hypodermic injection syringe. 3,874,382, Cl. 128-218.00P.

Nogier, Paul: *See—*
Nogier, Louis; and Nogier, Paul, 3,874,382.

Noguchi, Koichi, to Ricoh Co., Ltd. Charging control device. 3,875,482, Cl. 317-262.00A.

Noma, Shigeki, to Sun Engineering Co., Inc. Flow mixer. 3,875,060, Cl. 210-199.000.

Nonnenmacher, Gerhard, to Robert Bosch GmbH. Pintle for radial piston machines. 3,874,273, Cl. 91-498.000.

Norddeutsche Affinerie: *See—*
Reh, Lothar; Vydra, Karl; Doerr, Karl-Heinz; Grimm, Hugo; and Hennenberger, Karl-Heinz, 3,875,294.

Nordgard, Sigvard, to Sanaqua SA. Purifying apparatus for purifying contaminated water. 3,875,058, Cl. 210-151.000.

Norris, Lonnie H.; and Durand, Philip E., to United States of America, Army. Body armor system. 3,873,998, Cl. 2-2.500.

Nortec Computer Devices Inc.: *See—*
Curtiss, Robert H., 3,875,545.

Norton Company: *See—*
Fredriksson, John I.; and Coes, Samuel H., 3,875,477.

Nosaka, Teizou; Mase, Tohru; Tsukiyama, Toshitaka; Ohashi, Keiichi; and Ito, Yasushi, to Toyota Shatai Kabushiki Kaisha. Supporting apparatus for an upper bed deck of a mobile home vehicle. 3,874,009, Cl. 5-9.00R.

Nosal, Vsevolod Vladimirovich; Verderevsky, Vadim Anatolievich; Sokolovsky, Veniamin Izrailevich; and Platov, Vladimir Pavlovich. Tube cold rolling method. 3,874,212, Cl. 72-214.000.

Notz, Hans: *See—*
Bachmann, Robert; and Notz, Hans, 3,875,445.

Nouvertne, Werner; Muller, Peter Rolf; Peilstocker, Gunter; and Vernaleken, Hugo, to Bayer Aktiengesellschaft. Flame-resistant thermoplastic molding compositions and moldings made therefrom. 3,875,107, Cl. 260-37.0PC.

Novak, Arthur F.: *See—*
Mod, Robert R.; Magne, Frank C.; Sumrell, Gene; Novak, Arthur F.; and Solar, James M., 3,875,159.

Novey, Richard T. Safety manual release solenoid valve. 3,874,630, Cl. 251-68.000.

Nuclear Battery Corporation: *See—*
Goslee, David Earl; and Barr, Harold Newton, 3,874,935.

Nudenberg, Walter: *See—*
Little, Julian R.; Nudenberg, Walter; and Rim, Yong S., 3,875,236.

Nunlist, Rene, to Kern & Co. AG. Surveying instrument. 3,874,087, Cl. 33-275.000.

Nutter, Charles E.: *See—*
Richards, David O.; Jones, Isaac P.; Duffee, Homer W.; and Nutter, Charles E., 3,874,980.

Nyman, Bror Goran; and Hultholm, Stig-Erik, to Outokumpu Oy. Process for selective extraction of ferric iron from trivalent chromium by alkyl-phosphorous compounds. 3,875,285, Cl. 423-54.000.

Nysten, Bernhard P.: *See—*
Derr, Chester B.; and Nysten, Bernhard P., 3,874,578.

Obayashi, Mikio: *See—*
Arai, Tohru; Obayashi, Mikio; and Endo, Junji, 3,874,909.

Oberhaus, Wilhelm, to Heinrich Zangenberg GmbH & Co. Foldable tent. 3,874,397, Cl. 135-2.000.

Odams, Charles E., to American Standard Inc. Pulse-operated receiver. 3,875,518, Cl. 328-155.000.

O'Dea, Orrin B.; Johnson, Philip; and Morrison, Ralph, to Communication Mfg. Co. Revertive pulsing. 3,875,346, Cl. 179-18.00E.

O'Doherty, George O. P., to Eli Lilly and Company. Method for introducing halogen into benzimidazole and imidazopyridine compounds. 3,875,173, Cl. 260-294.80C.

Oertel, Harald; Roos, Ernst; and Ley, Kurt, to Bayer Aktiengesellschaft. Alpha, alpha-bis-(2-hydroxyphenyl)-diisopropyl benzenes. 3,875,246, Cl. 260-619.00B.

Offermanns, Heribert: *See—*
Von Bebenburg, Walter; and Offermanns, Heribert, 3,875,176.

Offutt, Carl R., to Whirlpool Corp. Thermal coupler for a dryness control circuit. 3,874,089, Cl. 34-45.000.

Ogawa, Isamu: *See—*
Muto, Kiyoshi; Yamamoto, Yasuhisa; Toyoda, Yoshinori; Azemi, Shozo; Okano, Shigeru; Masuyama, Kenya; Aihara, Seitaro; Ito, Takao; Ogawa, Isamu; and Harada, Mitsumasa, 3,874,062.

Ogiso, Mitsutoshi, to Canon Kabushiki Kaisha. Pulse signal generating circuit and control circuit using the same. 3,875,429, Cl. 307-246.000.

Ogle, James A.; and Holz, George E., to Burroughs Corporation. Panel-type display device. 3,875,474, Cl. 315-169.0TV.

Oguro, Tomokatsu: *See—*
Sato, Kazuo; Hirohata, Shigeki; and Oguro, Tomokatsu, 3,875,469.

Ohashi, Keiichi: *See—*
Nosaka, Teizou; Mase, Tohru; Tsukiyama, Toshitaka; Ohashi, Keiichi; and Ito, Yasushi, 3,874,009.

Ohkawa, Masaaki; Konishi, Seizo; Abeta, Sadaharu; and Okaniwa, Tetuo, to Sumitomo Chemical Company, Limited. Process for dyeing acid-modified polyester fibers and novel thiazoleazo-type cationic dyes. 3,874,847, Cl. 8-41.00C.

Ohki, Kusuo: *See—*
Iwaisako, Toshyyuki; Ohki, Kusuo; Kominami, Naoya; and Yomogida, Hisao, 3,875,048.

Ohrui, Tetsuya; Sakakibara, Yasuhito; Aono, Yukinaga; Kato, Michio; Takao, Hiroshi; and Kawaguchi, Tsunejiro, to Sumitomo Chemical Company, Limited. Process for continuously synthesizing acrylic acid esters. 3,875,212, Cl. 260-486.00R.

Ohsaka, Yoshisuke: *See—*
Katsumori, Teiji; Ohsaka, Yoshisuke; and Kato, Tetuo, 3,874,486.

Ohta, Tohru, to Shimizu Construction Co. Ltd., The. Apparatus for producing precast concrete members. 3,874,832, Cl. 425-88.000.

Ohtani, Atushi: *See—*
Hikota, Yuji; Yoshino, Shizuki; and Ohtani, Atushi, 3,874,257.

Ohtsuka, Shuichi: *See—*
Inoue, Eiichi; Kokado, Hiroshi; Shimizu, Isamu; and Ohtsuka, Shuichi, 3,874,881.

Oka, Shoji: *See—*
Okubo, Kenji; Endo, Satour; and Oka, Shoji, 3,874,751.

Oka, Takashi: *See—*
Abe, Fumiyuki; Oka, Takashi; Fukuda, Shigeo; Matsui, Shunji; Hirashima, Kenzo; and Hosaka, Akio, 3,874,695.

Okada, Hiroshi: *See—*
Kubota, Koji; Kamijo, Hirotaka; Mihara, Osamu; Okumura, Shinji; and Okada, Hiroshi, 3,875,001.

Okada, Masayasu: *See—*
Tamura, Ryoichi; Okada, Masayasu; Takase, Mituo; and Yamabe, Masahiro, 3,874,819.

Okamoto, Tadashi: *See—*
Yamamoto, Hisao; Inaba, Shigeho; Okamoto, Tadashi; Hirohashi, Toshiyuki; Ishizumi, Kikuo; Yamamoto, Michihiro; Maruyama, Isamu; Mori, Kazuo; Kobayashi, Tsuyoshi; and Izumi, Takahiro, 3,875,142.

Okaniwa, Tetuo: *See—*
Ohkawa, Masaaki; Konishi, Seizo; Abeta, Sadaharu; and Okaniwa, Tetuo, 3,874,847.

Okano, Shigeru: *See—*
Muto, Kiyoshi; Yamamoto, Yasuhisa; Toyoda, Yoshinori; Azemi, Shozo; Okano, Shigeru; Masuyama, Kenya; Aihara, Seitaro; Ito, Takao; Ogawa, Isamu; and Harada, Mitsumasa, 3,874,062.

Okano, Takeshi: *See—*
Igarashi, Shunichi; and Okano, Takeshi, 3,874,283.

Okimoto, Takeyoshi: *See—*
Kondo, Kyozo; and Okimoto, Takeyoshi, 3,874,297.

Okubo, Kenji; Endo, Satour; and Oka, Shoji, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho; and Nippon Seiko Kabushiki Kaisha. Device for supporting a spindle of an open-end spinning apparatus. 3,874,751, Cl. 308-26.000.

Okumura, Masaru: *See—*
Hashida, Taizo; Miyoshi, Shoji; Fujishima, Hiroyasu; and Okumura, Masaru, 3,874,436.

Okumura, Shinji: *See—*
Kubota, Koji; Kamijo, Hirotaka; Mihara, Osamu; Okumura, Shinji; and Okada, Hiroshi, 3,875,001.

Okuno, Zenjiro: *See—*
Machida, Hazime; Tsurugi, Akira; and Okuno, Zenjiro, 3,874,896.

O'Leary, Kevin J.: *See—*
Franks, Charles R.; Schenker, Barry A.; O'Leary, Kevin J.; and Kolb, James M., 3,875,043.

O'Leary, William: *See—*
Hayes, Philip; and O'Leary, William, 3,874,699.

Olschewski, Armin: *See—*
Ernst, Horst; Olschewski, Armin; and Brandenstein, Manfred, 3,874,028.

Olson, Mervyn D.; Hooley, Roy F.; McRai, John Bell; Stephens, Norman Murray; and Scotton, William R., to International Canadome Limited. Building panels. 3,874,141, Cl. 52-630.000.

Olson, Ralph A.: *See—*
Gardner, Clifford C.; and Olson, Ralph A., 3,874,696.

Olwert, Ronald J.: *See—*
Kaduk, Edward E.; and Olwert, Ronald J., 3,875,455.

Omichi, Takenori; Ikeda, Teppei; Adachihara, Shunich; and Yamamoto, Mobuo, to Fuji Photo Film Co., Ltd. Subbing method for photographic film support. 3,874,877, Cl. 96-87.00R.

Omron Tateisi Electronics Co., Ltd.: *See—*
Nagano, Akira; Urasaki, Kazuaki; and Miura, Masatugu, 3,875,393.

Onishi, Kazuo: *See—*
Hara, Hiroshi; and Onishi, Kazuo, 3,875,437.

Ono, Hiroyuki, to Aisin Seiki Kabushiki Kaisha. Air-suspension system for motor vehicles. 3,874,692, Cl. 280-124.00F.

Ono, Hisatake: *See—*
Watarai, Syu; Seoka, Yoshio; and Ono, Hisatake, 3,874,943.

Ono, Minoru; and Momoi, Toshimitu, to Hitachi, Ltd. Silicon nitride on silicon oxide coatings for semiconductor devices. 3,874,915, Cl. 117-212.000.

Onori, Bruno; and Luck, Meredith, to said Meredith Luck to said Bruno Onori. Unitary food tray make-up conveyor table apparatus. 3,874,479, Cl. 186-1.00D.

Oouchi, Keizi, to Hitachi, Ltd. Domestic refuse compactor. 3,874,282, Cl. 100-53.000.

Opatrny, Donald R.: *See—*
Zaccardelli, Richard A.; McClendon, Robert L.; and Opatrny, Donald R., 3,874,808.

Optical Recognition Systems, Inc.: *See—*
Welch, Rolland; Springer, Robert; Mayberry, Brian; and Sheppard, Robert, 3,874,653.

O'Reilly, Edward M.; Heftman, Alan; and Hoff, Lewis C., to Bartizan Corporation. Credit card imprinting apparatus. 3,874,291, Cl. 101-269.000.

Orenstein & Koppel AG: *See—*
Lorenz, Otto, 3,874,316.

Orion-Yhtyma Oy: *See—*
Bergrahm, Bengt Goran Flemming; and Teppo, Anna Maija, 3,875,045.

Orkin, Ona V.: *See—*
Schroeter, Siegfried Herman; and Orkin, Ona V., 3,875,094.

Ormond, Alfred Newman. Pancake load cell. 3,874,229, Cl. 73-141.00A.

Orn, Max D.: *See—*
Skinner, Harry W.; and Orn, Max D., 3,874,063.

Orsini, Leon; Laurent, Roger; and Dessevre, Denis, to P.B.U. (Progil-Bayer-Ugine). Method of polyurethane coating using a one-component polyurethane. 3,874,904, Cl. 117-72.000.

Ortho Pharmaceutical Corporation: *See—*
Homm, Roger; and Katz, Gilbert, 3,875,300.

Osaki, Tatsuo: *See—*
Kawakami, Koichi; and Osaki, Tatsuo, 3,874,057.

Oscobal AG: *See—*
Moser, Heinz; and Karpf, Kurt, 3,874,003.

Osterreichische Stickstoffwerke Aktiengesellschaft: *See—*
Weinrotter, Ferdinand; Schmidt, Alfred; and Gauster, Wolfgang, 3,875,222.

Osthues, Robert H., to Worcester Controls Corporation. Adjustable, corrosion-resistant, butterfly valve. 3,874,631, Cl. 251-148.000.

Oswald, Hendrikus J.: *See—*
Butler, Russell H.; Oswald, Hendrikus J.; and Kwon, Young D., 3,874,045.
Kwon, Young D.; Butler, Russell H.; Oswald, Hendrikus J.; and Kim, Dong W., 3,874,044.

Otis Engineering Corporation: *See—*
Dollison, William W., 3,874,414.
Gazda, Irme I., 3,874,634.
Pierce, Phillip E.; and Bostock, James H., 3,874,415.

Otomo, Yoshiro: *See—*
Kano, Tsuyoshi; Saitoh, Tadashi; Suzuki, Atsushi; Suzuki, Teruki; Minagawa, Shigekazu; and Otomo, Yoshiro, 3,875,456.

Otsu, Ikuo: *See—*
Kikuchi, Makoto; and Otsu, Ikuo, 3,874,121.

Ouhara, Souji: *See—*
Yagi, Takashi; Nanai, Sadaaki; Ouhara, Souji; and Shirakawa, Yukihiro, 3,875,468.

Outboard Marine Corporation: *See—*
Dahl, Einar S., 3,874,152.
Langley, John A., 3,874,318.

Outokumpu Oy: *See—*
Nyman, Bror Goran; and Hultholm, Stig-Erik, 3,875,285.

Owen, William A.: *See—*
Stephens, James B.; Owen, William A.; and Miller, Charles G., 3,874,597.

Owens-Corning Fiberglas Corporation: *See—*
Marzocchi, Alfred; and Brown, Alfred Winsor, 3,874,982.
Richards, David O.; Jones, Isaac P.; Duffee, Homer W.; and Nutter, Charles E., 3,874,980.

Owens-Corning Fiberglass Corporation: *See—*
Dunn, John William, 3,874,970.

Owens-Illinois, Inc.: *See—*
Cuniberti, Mario, 3,874,865.
Peters, Homer D.; and Rough, Robert R., 3,874,864.
Schermerhorn, Jerry D., 3,875,472.

Oxford Pendaflex Corporation: *See—*
Perry, Gordon; and Schmidt, Robert, 3,874,510.

P.B.U. (Progil-Bayer-Ugine): *See—*
Orsini, Leon; Laurent, Roger; and Dessevre, Denis, 3,874,904.

P. L. Porter Co.: *See—*
Porter, Clyde R.; and Sember, Joseph A., 3,874,480.

Packham, David Roy; and Gibson, Leonard, to Commonwealth Scientific and Industrial Research Organization; and Commonwealth of Australia, The. Smoke detector. 3,874,795, Cl. 356-104.000.

Palma, James R. Centrifugal separator with field effect separation. 3,875,061, Cl. 210-223.000.

Palmer, Thomas E.: *See—*
Daugherty, Phillip M.; Palmer, Thomas E.; and Tidd, Wilmot D., 3,875,105.

Pannier, Karl A., Jr.; Reynolds, Gordon S.; and Sorenson, James L., to Le Voy's, Inc. Method of monitoring venous or arterial pressure. 3,874,369, Cl. 128-2.05D.

Pao, Yoh-han; Freeman, Jonathan P.; and Allen, John W. Intensity modulated optical carrier communication system. 3,875,400, Cl. 250-199.000.

Papa, Anthony J.; and Proops, William R., to Union Carbide Corp. Process for the production of imido-isocyanates. 3,875,183, Cl. 260-326.00N.

Parker, Dorothy C., executrix: *See—*
Parker, Joseph D., deceased; Han, Shu Tang; and Hergert, Richard E., 3,874,509.

Parker-Hannifin Corporation: *See—*
Clark, Charles R., 3,874,410.

Parker, Joseph D., deceased (by Parker, Dorothy C., executrix); Han, Shu Tang; and Hergert, Richard E., to Beloit Corporation. Pressure screen and surge tank. 3,874,509, Cl. 209-240.000.

Parker, Russell H. R., to Superior Brush Company. Rotary brush assembly. 3,874,017, Cl. 15-182.000.

Parkin, William J., to Massachusetts Institute of Technology. Photosensitive tracking device with a.c. readout of position of image on special photocell. 3,875,402, Cl. 250-203.00R.

Parrinello, John. Food warmer. 3,874,361, Cl. 126-19.500.

Parsley, Robert L., to Dahlgren Manufacturing Company, Inc. Plate clamp. 3,874,292, Cl. 101-415.100.

Parson, Robert W.: *See—*
Jones, Stanley C.; and Parson, Robert W., 3,874,451.

Parsons, John S., to Stanley Works, The. Shock absorbing bearing assembly. 3,874,027, Cl. 16-128.000.

Parsons, Richmond S.: *See—*
Rossiter, Paul H.; and Parsons, Richmond S., 3,874,835.

Patarini, Leon M.; Bronec, Joseph A.; and Zundel, Arthur P., to National Can Corporation. End panel for containers. 3,874,555, Cl. 220-269.000.

Patel, Pravinkumar Goverdhanbhai; and Craig, Thomas Orr, to Sterling Moulding Materials. Polymeric compositions. 3,875,260, Cl. 260-878.00R.

Patience, Donald; Swallow, Roger T.; Hartigan, Edward G.; and Knohl, Herbert, to Colgate-Palmolive Company. Therapeutic stocking. 3,874,001, Cl. 2-240.000.

Patton, John T., Jr.; Pizzini, Louis C.; Levis, William W., Jr.; and Merkl, Bernard A., to BASF Wyandotte Corporation. Graft copolymers. 3,875,258, Cl. 260-869.000.

Patzelt, Helmut; Schiesterl, Gerhard; and Seybold, Albert, to Daimler-Benz Aktiengesellschaft. Protective device, especially for the passengers of motor vehicles. 3,874,693, Cl. 280-150.0AB.

Pauly, Ronald R.; and Fahrendorff, Curtis H., to Tonka Corporation. Toy bulldozer. 3,874,111, Cl. 46-40.000.

Pava, Thurman. Self-contained immersion exothermic fuel charge. 3,874,365, Cl. 126-263.000.

Pavey, Donald E.: *See—*
Dillard, Robert D.; and Pavey, Donald E., 3,875,245.

Payen, Jean-Pol, to Societe Dauphinoise Electrique. Suspension and coupling device for the movable magnetic field unit of a linear induction motor. 3,874,300, Cl. 104-148.0LM.

Payrhammer, Bernd: *See—*
Heckl, Egon; Jungkind, Roland; and Payrhammer, Bernd, 3,874,099.

Pdypur Forsaljnings AB: *See—*
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Pearce, Eli M.: *See—*
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Peckinpaugh, Frank Lee; and Bellemore, Joseph John, to Allied Chemical Corporation. Process to provide narrow yarn width of transfer tails of multifilament yarn. 3,874,047, Cl. 28-72.120.

Pedersen, George C. Methods for producing anhydrous hydrazine. 3,875,033, Cl. 204-157.10H.

Pedersen, Peder M., to Addressograph-Multigraph Corporation. Method and apparatus for ambient temperature pressure fixing of toners. 3,874,894, Cl. 117-17.500.

Peilstocker, Gunter: *See—*
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Penner, John H. Back therapy and exercise apparatus. 3,874,375, Cl. 128-75.000.

Pennwalt Corporation: *See—*
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Perce, Salvador; and Traina, Anthony, to GTE Automatic Electric Laboratories Incorporated. Duo-baffle air separator apparatus. 3,874,444, Cl. 165-47.000.

Perevuznik, Josef: *See—*
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Permut, Alan R.: *See—*
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Permut, Albert A.; Permut, Ronald M.; and Permut, Alan R. Vehicle closing speed limiter and performance monitoring systems. 3,874,475, Cl. 180-98.000.

Permut, Ronald M.: *See—*
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Perry Industries, Inc.: *See—*
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Perry, James T., to Willkie, Philip H., a part interest. Convertible rocking chair. 3,874,725, Cl. 297-133.000.

Peruglia, Marco; Amedei, Giuseppe; Bertone, Antonino; and Dotti, Giulio, to Fiat Societe per Azioni. Anti-skid device for hydraulic brake mechanisms. 3,874,745, Cl. 303-21.00F.

Peter, Bernd: *See—*
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Peters, Robert W. Stator coil press. 3,874,056, Cl. 29-205.00D.

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Peterson, Carmen A. Tease spoon. 3,874,109, Cl. 43-42.220.

Peterson, Paul F., to United States of America, Air Force. Weapon dispersal system. 3,874,266, Cl. 89-1.500.

Peth, Horst: *See—*
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Petigara, Ramesh B.: *See—*
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Petty, Walter L., to Shell Oil Company. Highly unsaturated polyethers. 3,875,189, Cl. 260-348.00R.

Pews, R. Garth; Goralski, Christian T.; and Burk, George A., to Dow Chemical Co., The. ((Trichloronit rophenyl)thio)acetonitriles. 3,875,203, Cl. 260-465.00G.

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Philip A. Hunt Chemical Corporation: *See—*
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Phillips, Keith; and Sahm, Peter, to Brown Boveri & Company Limited. Apparatus for the continuous casting or drawing of an extrusion body through a coolant body. 3,874,438, Cl. 164-283.00S.

Phillips Petroleum: *See—*
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Phillips Petroleum Company: *See—*
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Pickles, Joseph, to Ferro Manufacturing Corporation. Sun roof gear box. 3,874,722, Cl. 296-137.00G.

Picquendar, Jean Edgar; Duda, Eugene; and Marchal, Michel, to Thomas-Brandt. Method of manufacturing a master designed for the reproduction of records readable optically by diffraction. 3,875,024, Cl. 204-5.000.

Pierce, Phillip E.; and Bostock, James H., to Otis Engineering Corporation. Valve apparatus. 3,874,415, Cl. 137-625.660.

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Pisarri, Vincent: *See—*
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Pizzini, Louis C.: *See—*
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Poetsch, Dieter; and Peth, Horst, to Robert Bosch Fernsehanlagen GmbH. Circuit for modifying color characteristics. 3,875,583, Cl. 358-27.000.

Pogonowski, Ivo C., to Texaco Inc. High load carrying capacity, freeze and crack-proof concrete metal pile. 3,874,181, Cl. 61-53.000.

Pohl, Franz A.; Bohm, Harald; and Heffler, Joachim, to Licentia Patent-Verwaltungs-G.m.b.H. Fuel cell system including source of fuel containing hydrogen sulfide and method of using. 3,874,930, Cl. 136-86.00E.

Polaroid Corporation: *See—*
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Land, Edwin H., 3,874,875.
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Polos, Constantine D. Anchor bolt assembly. 3,874,264, Cl. 85-84.000.

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Portalign Tool Company: *See—*
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Porter, Clyde R.; and Sember, Joseph A., to P. L. Porter Co. Friction brake mechanism. 3,874,480, Cl. 188-67.000.

Porter, Harold E. Self-cooling or self-heating beverage container or the like. 3,874,557, Cl. 222-80.000.

Posielsky, Reinhold: *See—*
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Post, Robert C.; McCullough, Allen W.; and McClure, James H., to Materials Technology Corporation. Article coated with titanium carbide and titanium nitride. 3,874,900, Cl. 117-69.000.

Potter, Charles William, to Charles Weston & Company Limited. Seal mechanisms. 3,874,678, Cl. 277-29.000.

Potter, Ernest William; Ratcliffe, William; and Allen, Ronald Noel, to Henry Sykes Limited. Method of laying drainage tubing. 3,874,182, Cl. 61-72.500.

Potter, Thomas R., to Indicator Controls Corp. Vehicle detection system. 3,875,555, Cl. 340-38.00L.

Poundstone, William N.; and Miller, William J., to Continental Oil Company. Hydraulic method of mining and conveying coal in substantially vertical seams. 3,874,733, Cl. 299-17.000.

Powell, Mabrin P.: *See—*
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Powers, Raymond P.: *See—*
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Powning, Leslie George, to Sturtevant Engineering Company Limited. Pneumatic conveyors. 3,874,560, Cl. 222-193.000.

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Fraley, Richard W., 3,874,939.
Prucnal, Paul J.; and Friedlander, Charles B., 3,874,906.

Pradi, Louis A., to Sterling Drug Inc. Chip feeder for high pressure pulping system. 3,874,996, Cl. 162-246.000.

Prak, Jan Willem L., to Intersil, Inc. Current source biasing circuit. 3,875,430, Cl. 307-297.000.

Pratt, Robert E. Device for discouraging the jimmying of door locks. 3,874,717, Cl. 292-346.000.

Pratt, Winthrop B., to Curtiss-Wright Corporation. Sealing device for rotary mechanisms. 3,874,829, Cl. 418-115.000.

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Prinz, Roy H., to Celanese Corp. Improved process for crystallizing pentaerythritol from aqueous solutions. 3,875,248, Cl. 260-637.00P.

Prior, Arthur Cunningham, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defense in Her Britannic Majesty's Government of the. Methods suitable for use in or in connection with the production of microelectronic devices. 3,875,414, Cl. 250-492.000.

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Puckett, R. Otis; and Puckett, J. Richard. Self-propelled asphalt spreader. 3,874,807, Cl. 404-110.000.

Pugin, Andre: *See—*
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Pulp and Paper Research Institute of Canada: *See—*
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Purdy, George W. Grain cart. 3,874,530, Cl. 214-83.320.

Purification Sciences, Inc.: *See—*
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Pusch, Gunter. Method and device for ascertaining thermal constrasts. 3,875,408, Cl. 250-339.000.

Pyles, Robert Phillip, to Houze Glass Corporation. Decorative glassware. 3,874,977, Cl. 161-3.000.

Pyro Control, Inc.: *See—*
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Quantz, Norman G., to Lectron Products, Inc. Method and apparatus for detecting the utilization of a vehicle safety belt. 3,874,474, Cl. 180-82.00C.

Quate, Calvin F.; Havlice, James F.; and Kino, Gordon S., to Board of Trustees of Leland Stanford Junior University. Electronically focused acoustic imaging system and method. 3,875,550, Cl. 340-5.0MP.

Quenot, Michel, to Stanley-Mabo. Tape measure casing. 3,874,608, Cl. 242-84.800.

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Quinn, Alton Dewitt: *See—*
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Racek, Alfred. Gas-fuelled lighter. 3,874,842, Cl. 431-276.000.

Racicot, Andre. Machine for corrugating a trough-shaped metal strip. 3,874,214, Cl. 72-307.000.

Radiant Energy Systems, Inc.: *See—*
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Radlmann, Eduard; and Nischk, Gunther, to Bayer Aktiengesellschaft. Acrylonitrile polymers with anti-static properties. 3,875,127, Cl. 260-85.50R.

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Rafael, Johann. Device for cleaning water polluted by oil. 3,875,062, Cl. 210-242.000.

Rago, John Joseph. Emergency fire escape. 3,874,632, Cl. 254-159.000.

Railroad Dynamics Inc.: *See—*
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Raisler, Robert: *See—*
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Ramey, Bobbie Joe; and Cuscurida, Michael, to Jefferson Chemical Company, Inc. Urethane containing monohydric polyether chain stoppers. 3,875,086, Cl. 260-2.5AM.

Ramey, Chester E.; and Luzzi, John J., to Ciba-Geigy Corporation. Bicyclic hindered amines. 3,875,169, Cl. 260-293.540.

Rana, Victoriano Fernandez, to Harris-Intertype Corporation. Signature handling system. 3,874,522, Cl. 214-7.000.

Randall, David I.; and Wynn, Robert W., to GAF Corporation. Cyclic diamides of 2-chloroethyl phosphonic acid. 3,875,157, Cl. 260-246.00B.

Randlett, Myron R.: *See—*
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Rankin, Gerald L., to Westinghouse Electric Company. Industrial gas turbine power plant control system and method implementing improved dual fuel scheduling algorithm permitting automatic fuel transfer under load. 3,875,380, Cl. 235-151.100.

Rankin, John Charles. Audio frequency amplifier. 3,875,520, Cl. 330-10.000.

Rapoport, Henry, to University of Ca., The Regents of The. Certain 5-thia-1-azabicyclo[4.2.0]octenes. 3,875,154, Cl. 260-243.00R.

Raque, Robert G., to FMC Corporation. Can opener with helically mounted blade. 3,874,078, Cl. 30-5.500.

Rasch, Arthur A.; and Hodges, Wilbur C., to Eastman Kodak Company. Photographic article with composite oxidation protected antistatic layer. 3,874,878, Cl. 96-87.00A.

Rasch, Arthur A., to Eastman Kodak Company. Article with oxidation protected adhesive and anti-static layer. 3,874,879, Cl. 96-87.00A.

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Rasmussen, Reed; and Rasmussen, Carl M. Camper loading and securing system. 3,874,244, Cl. 74-30.000.

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Rawlings, Robert M.; and Rawlings, Frank N. Ruminant feed supplement comprising an ammoniated protein-aldehyde complex. 3,875,310, Cl. 426-210.000.

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Reistad, Bengt Reistad, to Aktiebolaget Electrolux. Absorption refrigerator with additional means for defrosting the refrigerator. 3,874,193, Cl. 62-490.000.

Rembaum, Alan, to United States of America, National Aeronautics and Space Administration. Heat detection and compositions and devices therefor. 3,874,240, Cl. 73-356.000.

Remery, Michel; and Mothiron, Claude, to U.S. Phillips Corporation. Arrangement for igniting and supplying a discharge lamp. 3,875,459, Cl. 315-205.000.

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Renner, Hermann; and Barenyi, Bela, to Daimler-Benz Aktiengesellschaft. Door for vehicles, especially passenger motor vehicles. 3,874,119, Cl. 49-502.000.

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Research Corporation: *See—*
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Reuter, William L.; and Schmidt, Allen P., to Dunham Associates, Inc. Motor protection circuit and automatic restart control system. 3,875,463, Cl. 317-13.00R.

Rexroth und Szekessy Entwicklung GmbH: *See—*
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Reynard, Remi; Chatard, Michel; Willm, Yves; and Grolet, Pierre, to Institut Francais Du Petrole, Des Carburants Et Lubrifiants,. Device for fishing from a borehole an elongated member, such as a drill string. 3,874,720, Cl. 294-86.260.

Reynolds, Gordon S.: *See—*
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Reynolds Metals Company: *See—*
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Reynolds, William A.: *See—*
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Rhone-Ponlenc S.A.: *See—*
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Rhone-Poulenc S.A.: *See—*
Belloc, Andre; Florent, Jean; Lunel, Jean; Mancy, Denise; and Verrier, Jean, 3,875,005.
Belloc, Andre; Florent, Jean; Mancy, Denise; and Verrier, Jean, 3,875,006.
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Rhone-Poulenc S.A.: *See—*
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Riba, Morris. Pet tending device. 3,874,341, Cl. 119-51.120.

Richards, David O.; Jones, Isaac P.; Duffee, Homer W.; and Nutter, Charles E., to Owens-Corning Fiberglas Corporation. Composite foam panel with fibrous facing sheets. 3,874,980, Cl. 161-41.000.

Richards, Dorman C.: *See—*
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Richards, Nolan Earle; and Berry, James Simmons, Jr., to Reynolds Metals Company. Detection of grounded anodes. 3,875,030, Cl. 204-67.000.

Richardson Company, The: *See—*
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Richardson, Robert Harold; Smith, William Merdoc; and Davis, Robert Carlton, to Harris-Intertype Corporation. Static eliminator. 3,875,461, Cl. 317-2.00F.

Richert, Hans: *See—*
Brandl, Herman; Kaiser, Hermann; Richert, Hans; Rozanski, Franz; Suchy, Herbert; and Hunecke, Theodor, 3,875,231.

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Ishikawa, Chuji, 3,874,286.
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Suzuki, Minoru, 3,874,290.
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Riedel, Charles E., to GTE Automatic Electric Laboratories Incorporated. Lost gas indicator for gas tube lighting arrestors. 3,875,465, Cl. 317-61.000.

Riedel, Charles E., to GTE Automatic Electric Laboratories Incorporated. Geometrical and symmetrical gas tube lightning protectors. 3,875,467, Cl. 317-62.000.

Riehl, Fred, to Robertshaw Controls Company. Burner construction and method and apparatus for making same. 3,874,839, Cl. 431-354.000.

Rife, John W.: *See—*
Cover, Paul F.; Rife, John W.; and Kemper, Clyde F., 3,874,498.

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Muramatsu, Mobuhiro; Aoki, Kosuke; and Miki, Masamichi, 3,874,130.

Riley, Russell B., to Hewlett-Packard Company. Sweep generator circuit for an electronic apparatus which produces a sweep signal having a sweep rate programmed by the settings of a selected plurality of controls of the electronic apparatus. 3,875,427, Cl. 307-228.000.

Rim, Yong S.: *See—*
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Rindisbacher, Fritz, to Aeromatic AG. Atomizer for spraying a liquid medium. 3,874,595, Cl. 239-227.000.

Ring, Gregg: *See—*
Young, John Wallace; Firkins, Robert Charles; Ring, Gregg; and Tatum, John A., Jr., 3,874,465.

Ritter, Ann Lance. Organic compost collector for sink drain system. 3,874,006, Cl. 4-189.000.

Ritz, Jurgen: *See—*
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Ritzerfeld, Gerhard. Selectively printing rotary duplicator. 3,874,284, Cl. 101-91.000.

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Rjork, Bengt; Gustafsson, Bertil; and Johansson, Leif, to AB Stathmos. Beam scale. 3,874,467, Cl. 177-250.000.

Roach, Mary E., to General Electric Company. Mounting clip for a dynamoelectric machine. 3,875,439, Cl. 310-68.00C.

Robbins, Harry, to Eastman Kodak Co. Method for making ferromagnetic chromium dioxide. 3,875,297, Cl. 423-607.000.

Robert Bosch Fernsehanlagen GmbH: *See—*
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Robert Bosch G.m.b.H.: *See—*
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Robert, Jean. Conveyors. 3,874,304, Cl. 104-172.00S.

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Robertson, James F. Back roll cleaning apparatus and method. 3,874,394, Cl. 134-6.000.

Robillard, Edward G.: *See—*
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Robinson, John C. Animal actuated door. 3,874,118, Cl. 49-402.000.

Robinson, Michael; Clamp, Frank; Aberdeen, David; Mobbs, David Barry; and Pearse, Richard Vyvian, to Laporte Industries Limited. Beneficiation of ilmenite ores. 3,875,286, Cl. 423-86.000.

Robinson, Norman M., to Certain-teed Products Corporation. Web splicing method. 3,874,968, Cl. 156-154.000.

Robitaille, Dennis R.; Vukasovich, Mark S.; and Barry, Henry F., to American Metal Climax, Inc. Corrosion inhibiting pigment and method of making same. 3,874,883, Cl. 106-14.000.

Roch, Gerald V.; and Sonn, Edward H., to Hurco Manufacturing Company, Inc. Digitally controlled multiple depth stop and return stroke limit control for press brakes. 3,874,205, Cl. 72-8.000.

Roch, Gerald V., to Hurco Manufacturing Company, Inc. Corner sheared blank conveying apparatus and method. 3,874,260, Cl. 83-27.000.

Rock-Ola Manufacturing Corporation: *See—*
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Rockwell International Corporation: *See—*
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Roger, Theodor. Burner nozzle. 3,874,599, Cl. 239-557.000.

Rohm GmbH: *See—*
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Roos, Ernst: *See—*
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Rose, Ralph E., to Signetics Corporation. Semiconductor structure with bumps and method for making the same. 3,874,072, Cl. 29-578.000.

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Rosenberg, William E.; and Eckles, William E., to R. O. Hull & Company, Inc. Plating bath for electrodeposition of bright tin and tin-lead alloy. 3,875,029, Cl. 204-43.00S.

Rosenbloom, William J. Recovery of oil from tar sand by an improved extraction process. 3,875,046, Cl. 208-11.000.

Rosenblum, Jesse. Vibratory separator screen. 3,875,065, Cl. 210-388.000.

Rosengren, Karl Yngve Kjell: *See—*
Antonsson, Leif-Goran; Redlund, Joel Karl Gosta; and Rosengren, Karl Yngve Kjell, 3,874,798.

Ross, Douglas; Herrmann, Hans H.; and Renschler, Harley Robert, to CTEC Corporation. Roll trailer hitching apparatus. 3,874,703, Cl. 280-425.00R.

Ross, Henry M. Can-filling method for meat-canning process. 3,874,426, Cl. 141-11.000.

Ross, Peter. Tennis Racket having incorporated ball retrieval means. 3,874,666, Cl. 273-73.00R.

Ross, Robert Rogers: *See—*
Anderson, Charles Victor; Fleming, Mills Lawrence; Kotzias, George Anthony; Ross, Robert Rogers; and Williams, James Luchin, 3,875,325.

Rossberg, Peter: *See—*
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Rossiter, Paul H.; and Parsons, Richmond S., to Welding Engineers, Inc. Face-cutting apparatus for forming pellets. 3,874,835, Cl. 425-306.000.

Rossmanith, Otto, to Messerchmitt-Boelkow-Blohm GmbH. Torque motor, especially for the rudder gear of a flying object. 3,875,544, Cl. 335-230.000.

Rota, Benjamin: *See—*
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Rothenbuhler, Howard E.: *See—*
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Rousar, Ivo: *See—*
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Rowell, Narvell E. Plantbed cover assembly. 3,874,114, Cl. 47-29.000.

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Roy, Marie-Annick; Cabet, Alain; and Desombre, Patrice, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Digital system forming a frequency multiplex system. 3,875,340, Cl. 179-15.0FD.

Royce, Robert E. Vehicle mounted access ramp for wheelchair users. 3,874,527, Cl. 214-77.00R.

Rozanski, Franz: *See—*
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Rubenstein, Kenneth Edward; and Ullman, Edwin F., to Syva Company. Enzyme immunoassays with glucose-6-phosphate dehydrogenase. 3,875,011, Cl. 195-99.000.

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Ruhrchemie Aktiengesellschaft: *See—*
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Ryden, Hans; Bjelkhagen, Hans Ingmar; and Abramson, Nils H. L., to said Bjelkhagen and said Abramson to said Ryden. Device for measurement of the displacement of a tooth. 3,875,420, Cl. 250-578.000.
Rys, Tadeusz J., to Square D. Co. Stored-energy operating mechanism for switch blades. 3,875,360, Cl. 200-153.0SC.
S.A. des Etablissements Roure-Bertrand Fils & Justin Dupont: *See—*
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St. Andre, Arthur F.: *See—*
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Salartron Electric Group Limited, The: *See—*
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Samples, Charles R. Method of making a heat detecting tire, a heat detecting tire, and operative tire heat detecting system. 3,875,558, Cl. 340-58.000.
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Sanctuary, Clifford; Woods, Donald C.; and Bachman, John A., to Del Mar Engineering Laboratories. Gas volume meter. 3,874,233, Cl. 73-194.00E.
Sanden, Ulrich Christian, to Diessel GmbH & Co. Rotary piston meter for measuring the flow of liquids. 3,874,235, Cl. 73-253.000.
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Sanders, John P. Method of constructing submersible structures utilizing submarine hulls. 3,874,314, Cl. 114-.50D.
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Sands, Michael A.; and Marino, Santino Paul, to CPC International, Inc. Non-hygroscopic, water-soluble sugar products and process for preparing the same. 3,874,924, Cl. 127-29.000.
Sanga, Yasuhiro. Method of and apparatus for producing activated charcoal from waste tires. 3,875,077, Cl. 252-425.000.
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Saunders, James Edwin; and Vincent, Alan Henry, to Westland Aircraft Limited. Bifilar vibration dampers. 3,874,818, Cl. 416-144.000.
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Scalzo, Augustine J.; and Shah, Chandrakant C., to Westinghouse Electric Corporation. Gas turbine exhaust system expansion joint. 3,874,711, Cl. 285-236.000.
Scarpino, John J.; and Ventre, Daniel B., to Hope-Tronics Limited. Flashing vehicle warning beacon with lens and reflector. 3,875,561, Cl. 340-81.00R.
Schantz, Spencer C. Method of forming and installing pressure responsive diaphragms. 3,874,052, Cl. 29-157.00R.
Scheler, Holger, to Hermann Traub, Firma. Apparatus for feeding an elongate workpiece to a machine tool. 3,874,520, Cl. 214-1.500.
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Schiff, Arthur: *See—*
Mendelow, Robert; Schiff, Arthur; Silverman, Abraham; and Stopek, Benjamin, 3,874,132.

Schiller, Norman E. Collet adapter. 3,874,688, Cl. 279-50.000.

Schioberg, Eva-Maria, to LICENTIA Patent-Verwaltungs-GmbH. Arrangement for mounting a microwave component with a solderless ground connection. 3,875,541, Cl. 333-97.00R.

Schirmer, Henry George, to W. R. Grace & Co. Entrapped liquid treatment of laminated film. 3,874,967, Cl. 156-145.000.

Schlunke, Hans-Peter; and Egli, Christian, to Ciba-Geigy AG. oxy substituted 2,3 oxy methyl quinoxalines. 3,875,158, Cl. 260-250.00Q.

Schmid, Wolfgang; Bleicher, Manfred; Hansel, Gernot; and Wanner, Karl, to Robert Bosch GmbH. Impact wrench. 3,874,460, Cl. 173-109.000.

Schmidt, Alfred: *See—*
Weinrotter, Ferdinand; Schmidt, Alfred; and Gauster, Wolfgang, 3,875,222.

Schmidt, Allen P.: *See—*
Reuter, William L.; and Schmidt, Allen P., 3,875,463.

Schmidt-Balve, Helmut; and Albertz, Alfred, to Dr. C. Otto & Comp. G.m.b.H. Method and apparatus for controlling the operation of regeneratively heated coke ovens. 3,875,016, Cl. 202-151.000.

Schmidt, Gertraud A.: *See—*
Bopp, Louis A.; Jachimowicz, Ludwik; and Schmidt, Gertraud A., 3,875,323.

Schmidt, James R.: *See—*
Franklin, Mark E.; and Schmidt, James R., 3,874,081.

Schmidt, Max. Covering- or sealing-apparatus for food-containers which are filled, preferably, with frozen foods. 3,874,145, Cl. 53-112.00R.

Schmidt, Peter; Kizler, Harald; Maisch, Wolfgang; Peter, Bernd; Wahl, Josef; Linder, Ernst; and Neidhard, Horst, to Robert Bosch GmbH. Exhaust gas composition control with after-burner for use with internal combustion engines. 3,874,171, Cl. 60-276.000.

Schmidt, Robert: *See—*
Perry, Gordon; and Schmidt, Robert, 3,874,510.

Schmidt, Ronald Vernon, to Bell Telephone Laboratories, Incorporated. Light-guiding switch, modulator and deflector employing antisotropic substrate. 3,874,782, Cl. 350-96.0WG.

Schmidt, William M.: *See—*
Seifert, Lester H.; Powers, Raymond P.; Schmidt, William M.; Thorwaldsen, Stanley E.; Smith, Frederick; McElroy, David; and Dunton, Roy P., 3,874,149.
Seifert, Lester H.; Powers, Raymond P.; Schmidt, William M.; Thorwaldsen, Stanley E.; Smith, Frederick W.; McElroy, David C.; and Dunton, Roy P., 3,874,151.

Schmitt, Albert; Vogel, Hans; and Tomoff, Toma, to Bodenseewerk Perkin-Elmer & Co. GmbH. Method and apparatus for photometric analysis of substantially colorless components of sample. 3,874,794, Cl. 356-36.000.

Schmitz, Richard L.: *See—*
Eddleman, Roy T.; Schmitz, Richard L.; and Sharbaugh, David A., 3,874,042.

Schnaibel, Eberhard; and Fleischer, Helmut, to Robert Bosch GmbH. Wheel brake antilock system with noise signal rejection circuit. 3,874,741, Cl. 303-21.0BE.

Schnaibel, Eberhard: *See—*
Fleischer, Helmut; and Schnaibel, Eberhard, 3,874,743.

Schneider, Paul: *See—*
Behrens, Heinz; Schneider, Paul; and Zapf, Ernst, 3,874,844.

Schneider, William P., to Upjohn Company, The. Process for isolating PGA_2 acetate methyl ester and its 15-beta epimer. 3,875,214, Cl. 260-499.000.

Schnitt, Arthur: *See—*
Silva, Tony H.; and Schnitt, Arthur, 3,874,299.

Scholtis, Walter; Wallisch, Hans; Stuber, Wolfgang; and Fentos, Sabine, to VEB Plauener Spritze. Method of making burned-out fabric. 3,874,958, Cl. 156-7.000.

Schottmiler, John C.: *See—*
Wood, Charles; Schottmiler, John C.; and Ryan, Francis W., 3,874,917.

Schreiber, Erich: *See—*
List, Hans; and Schreiber, Erich, 3,874,357.

Schroeder, Fred G., to Fibre Formations, Inc. Machine for producing pulp bats. 3,874,831, Cl. 425-80.000.

Schroeter, Siegfried Herman; and Orkin, Ona V., to General Electric Company. Radiation curable polyester. 3,875,094, Cl. 260-28.000.

Schuierer, Erich; Ulm, Klaus; Rebsdat, Siegfried; and Wimmer, Ignaz, to Hoechst Aktiengesellschaft. Process for preparing nitric acid esters of 1,1,2,2-tetrahydro-perfluoro-alkanols. 3,875,206, Cl. 260-467.000.

Schultz, Fred R.; and Morran, James R., to Aluminum Company of America. Easy opening can end with embossed panel. 3,874,553, Cl. 220-273.000.

Schumacher, Larry L.: *See—*
United States of America, National Aeronautics and Space Administration; and Schumacher, Larry L., 3,875,404.

Schuplin, Jerome T., to Fastway Fasteners, Inc. Hanger clip. 3,874,035, Cl. 24-84.00H.

Schurhoff, Walter, to Hoesch Werke Aktiengesellschaft. Slag sand collecting hopper for a slag sand water mixture drainage silo. 3,874,737, Cl. 302-15.000.

Schwam, Stuart A., to Railroad Dynamics Inc. Hydraulic bolster dampening device. 3,874,307, Cl. 105-197.0DH.

Schwartzman, Gilbert. Applicator having multiple valve assemblies. 3,874,563, Cl. 222-213.000.

Schwartzschild, Jack: *See—*
Boxberger, Raymond Robert; and Schwartzschild, Jack, 3,874,162.

Schwarz, Hans George: *See—*
Gibson, John James; and Schwarz, Hans George, 3,875,328.

Schwenke, Dieter. Method and machine for accurate formation of teeth on elliptical gears. 3,874,267, Cl. 90-4.000.

Schwitters, Henry. Hygenic foot protector. 3,874,100, Cl. 36-11.500.

SCM Corporation: *See—*
DeSorgo, Miksa; and McGinniss, Vincent D., 3,875,067.

Scott & Fetzer Company, The: *See—*
MacFarland, Charles H., 3,875,436.

Scotton, William R.: *See—*
Olson, Mervyn D.; Hooley, Roy F.; McRai, John Bell; Stephens, Norman Murray; and Scotton, William R., 3,874,141.

Scripto, Inc.: *See—*
Daugherty, Phillip M.; Palmer, Thomas E.; and Tidd, Wilmot D., 3,875,105.

Scuitto, Thomas John; and Kramer, David Chester, to Frederick D. Toye; and Frederick N. Toye. Reader device for coded identification card. 3,875,375, Cl. 235-61.70B.

Sea Savory, Inc.: *See—*
Wenstrom, Richard T.; Reinke, Theodore S.; Tolley, Calvert B.; and Brooks, J. Clayton, 3,875,050.

Seatrek Ltd.: *See—*
Madsen, Andrew, 3,875,497.

Seay, William Jackson: *See—*
London, Herbert S.; and Seay, William Jackson, 3,874,115.

Sebel, Harry; and Furey, Dillon Charles, to Sebel Limited. Moulded chairs. 3,874,726, Cl. 297-239.000.

Sebel Limited: *See—*
Sebel, Harry; and Furey, Dillon Charles, 3,874,726.

Seckler, David W.; and Harper, Judson M., to Ceres Ecology Corporation. Process and apparatus for recovering feed products from animal manure. 3,875,319, Cl. 426-431.000.

Secretary of State for Defense in Her Britannic Majesty's Government of the United Kingdom of Great Britain & Northern Ireland, The: *See—*
Eccles, Edward Stuart; Waddicor, Andrew Hurlstone; Roberts, Eric; and McNamara, John, 3,875,390.

Sedgwick, Thomas O.: *See—*
Kazan, Benjamin; and Sedgwick, Thomas O., 3,875,457.

Sedlak, John Andrew, to American Cyanamid Company. Process of making paper where an ionic vinylamide polymer latex is added to the furnish to improve dry strength of the paper. 3,874,994, Cl. 162-163.000.

Sedlak, John Andrew. Ionic vinylamide polymer latex and manufacture of paper therewith. 3,875,097, Cl. 260-29.4UA.

Sedlak, John Andrew, to American Cyanamid Company. Ionic vinylamide polymer latex and manufacture of paper therewith. 3,875,098, Cl. 260-29.4UA.

Seegall, Manfred I.: *See—*
Compton, William A.; Duffy, Thomas E.; and Seegall, Manfred I., 3,874,238.

Seehusen, Donald G., to United States Rock Company, Inc. Structural wall member with sculptured surface and method of making same. 3,874,140, Cl. 52-315.000.

Seek-A-Leak, Inc.: *See—*
Smith, Richard S., 3,874,224.

Seifert, Lester H.; Powers, Raymond P.; Schmidt, William M.; Thorwaldsen, Stanley E.; Smith, Frederick; McElroy, David; and Dunton, Roy P. Self-propelled lawn mower. 3,874,149, Cl. 56-12.200.

Seifert, Lester H.; Powers, Raymond P.; Schmidt, William M.; Thorwaldsen, Stanley E.; Smith, Frederick W.; McElroy, David C.; and Dunton, Roy P. Self-propelled lawn mower. 3,874,151, Cl. 56-17.200.

Seiko Seiki Kabushiki Kaisha: *See—*
Ishii, Katsutoshi, 3,874,128.

Seki, Chichitada; and Hisatomi, Takashi, to Nissan Motor Company, Limited. Carburetor float. 3,875,267, Cl. 261-70.000.

Sekine, Yoichi, to Matsushita Electric Industrial Co., Ltd. Electrorecording paper. 3,875,023, Cl. 204-2.000.

Sekisui Kaseihin Kogyo Kabushiki Kaisha: *See—*
Hayashi, Motoshige; Kukumura, Mikio; and Sano, Zengo, 3,874,981.

Selbie, Frederic D., III: *See—*
Mustoe, David L.; Selbie, Frederic D., III; and Fenerty, Michael J., 3,874,680.

Seligmann, Peter Charles, to AE & CI Limited. Fuses and cords. 3,874,293, Cl. 102-27.00R.

Sellerstam, Kjell Birger, to Aktiebolaget Electrolux. Control for gas-electric refrigerator. 3,875,369, Cl. 219-279.000.

Sellstedt, John H., to American Home Products Corp. Intermediates for producing semi-synthetic cephalosporins and methods of production. 3,875,152, Cl. 260-243.00C.

Sema, Katsutosh; Wakao, Mitsuru; Kobayashi, Yoshinori; and Hara, Koichi, to Japanese National Railways and Kayabakogyo Kabushikikaisha. Robot locomotive for classifying rolling stocks. 3,874,305, Cl. 105-26.00R.

Sember, Joseph A.: *See—*
Porter, Clyde R.; and Sember, Joseph A., 3,874,480.

Semola, Vincent J.; and Droesbeke, Kenneth C., to Stallion Enterprises Inc. Keyed attachment device for vehicle wheels. 3,874,258, Cl. 81-121.00R.

Seoka, Yoshio: *See—*
Watarai, Syu; Seoka, Yoshio; and Ono, Hisatake, 3,874,943.

Seron Manufacturing Company: *See—*
Seron, Suren V., 3,874,776.

Seron, Suren V., to Seron Manufacturing Company. Retainer for eyeglasses. 3,874,776, Cl. 351-123.000.

Seto, Kunihira: *See—*
Hibino, Noburo; Seto, Kunihira; Kobayashi, Teruo; and Inoue, Kazuo, 3,874,876.

Setzer, William C.: *See—*
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Seybold, Albert: *See—*
Patzelt, Helmut; Schiesterl, Gerhard; and Seybold, Albert, 3,874,693.

Shaffer, George Raymond; and Russell, Warren Jene, to Becton Dickinson and Company. Device for housing and retaining small volumes of gelled media. 3,874,503, Cl. 206-205.000.

Shaffer, William, Jr. Optical plumbing apparatus. 3,874,088, Cl. 33-286.000.

Shah, Chandrakant C.: *See—*
Scalzo, Augustine J.; and Shah, Chandrakant C., 3,874,711.

Shamp, Donald E.: *See—*
Mochon, Casmir F.; Poley, Joseph E.; and Shamp, Donald E., 3,874,863.

Shank, Wayne C.: *See—*
Cronstedt, Val; and Shank, Wayne C., 3,874,824.

Shapiro, Gerald N.; and Sobel, Herbert S., to Raytheon Company. Pipeline signal processor. 3,875,391, Cl. 235-156.000.

Sharbaugh, David A.: *See—*
Eddleman, Roy T.; Schmitz, Richard L.; and Sharbaugh, David A., 3,874,042.

Sharman, Samuel H.: *See—*
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Shay, Joseph Leo: *See—*
Bachmann, Klaus Jurgen; Buehler, Ernest; Shay, Joseph Leo; and Wernick, Jack Harry, 3,875,451.

Shedd, James F.: *See—*
Hogman, Medford N.; Shedd, James F.; Yett, Keith S.; and Kolve, Harold A., 3,875,552.

Sheldon, Robert S., to Air-Dry Corporation of America. Low pressure dew and frost point indicator. 3,874,220, Cl. 73-17.00A.

Shell Oil Company: *See—*
McClure, James D., 3,875,240.
Petty, Walter L., 3,875,189.
Stouthamer, Bernhard; and Kwantes, Arien, 3,875,239.

Shepherd, Warren Arnold, Jr.; Ketchpel, Paul Allison, Jr.; Johnson, Edward John; and Biondi, Frank George, to Stanley Works, The. Hand tool connection and trim collar therefor. 3,874,433, Cl. 145-29.00R.

Sheppard, Elwood H. Slowed alternating current magnetic novelty. 3,874,102, Cl. 40-106.450.

Sheppard, Robert: *See—*
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Sherwin-William Company, The: *See—*
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Shettel, Ralph E. Irrigation control. 3,874,176, Cl. 61-25.000.

Shibata, Akira, to Chugai Denki Kogyo Kabushiki-Kaisha. Silver-metal oxide contact materials. 3,874,941, Cl. 75-173.00R.

Shimizu Construction Co. Ltd., The: *See—*
Ohta, Tohru, 3,874,832.

Shimizu, Isamu: *See—*
Inoue, Eiichi; Kokado, Hiroshi; Shimizu, Isamu; and Ohtsuka, Shuichi, 3,874,881.

Shimizu, Yoshiyuki, to Nippon Kogaku K.K. Retrofocus type wide-angle photographic lens. 3,874,770, Cl. 350-214.000.

Shimotsuma, Sakae: *See—*
Aoki, Hiroshi; Shimotsuma, Sakae; Masuda, Masanori; Asai, Takeo; and Matsumoto, Hujio, 3,875,119.

Shimura, Kazuhiko: *See—*
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Shiosaka, Makota: *See—*
Kato, Koso; and Shiosaka, Makota, 3,875,308.

Shiozawa, Kaoru, to Mitsui Shipbuilding and Engineering Co. Ltd. Automatic sorting apparatus in pipe working system. 3,874,217, Cl. 72-419.000.

Shipley Company, Inc.: *See—*
Gulla, Michael; and Conlan, William A., 3,874,882.

Shipley, Linden E.: *See—*
Crandall, William B.; and Shipley, Linden E., 3,875,476.

Shipstad, Donald R.; and Borden, Don, to Hot Grips, Ltd. Ski pole hand shield and method of manufacture. 3,874,686, Cl. 280-11.37H.

Shiraishi, Hideo, to Toyo Kogyo Co. Ltd. Ignition system for an internal combustion engine. 3,874,350, Cl. 123-117.00R.

Shirakawa, Yukihiro: *See—*
Yagi, Takashi; Nanai, Sadaaki; Ouhara, Souji; and Shirakawa, Yukihiro, 3,875,468.

Shneiser, Boris Yakovlevich: *See—*
Lapitsky, Igor Nikolaevich; Sabadakh, Bogdan Vasilievich; Sumtsov, Gennady Grigorievich; Xenevich, Ivan Pavlovich; Skoibeda, Anatoly Tikhonovich; Venzel, Leonid Isaakovich; Tolstoguzov, Viktor Sergeevich; Shneiser, Boris Yakovlevich; and Korolkevich, Alexandr Viktorovich, 3,874,251.

Shoop, John C.: *See—*
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Shortlidge, Donald L.: *See—*
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Shott, Frank A.; Skinner, Dean W.; and Subik, Vincent P., to International Business Machines Corporation. Electrical cable connecting device. 3,874,762, Cl. 339-91.00R.

Shovlin, Thomas F.: *See—*
Conner, Joseph R.; Mayer, George E.; and Shovlin, Thomas F., 3,874,281.

Showa Denko Kabushiki Kaisha: *See—*
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Shuster, Edward J.: *See—*
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Sibley, Harold E., to Bangor Punta Operations, Inc. Cartridge casing extraction mechanism for revolvers. 3,874,104, Cl. 42-68.000.

Sieber, Peter: *See—*
Iselin, Beat; and Sieber, Peter, 3,875,207.

Siegal, Burton L., to Tiffany Industries, Inc. Joint structure. 3,874,804, Cl. 403-353.000.

Siegele, Frederick H.; and Rabinowitz, Robert, to American Cyanimid Company. Coagulation of oil-extended emulsions. 3,875,104, Cl. 260-33.6AQ.

Siegers, Gunter, to Bayer Aktiengesellschaft. Process for carrying out ion exchange and adsorption processes using a countercurrent vessel. 3,875,053, Cl. 210-35.000.

Siemens Aktiengesellschaft: *See—*
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Siemens Aktiengesellschaft Osterreich: *See—*
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Silva, Tony H.; and Schnitt, Arthur, to Aerospace Corporation, The. Electromagnetic switching. 3,874,299, Cl. 104-130.000.

Silverberg, Morton, to Xerox Corporation. Enveloped stylus recorder. 3,875,578, Cl. 346-74.0ES.

Silverman, Abraham: *See—*
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Silverstein, Jerome: *See—*
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Silvius, Arthur Aurelius Xaverius. Systems for interconnecting plates. 3,874,133, Cl. 52-758.00D.

Simkus, Vyto: *See—*
Jesevich, John; and Simkus, Vyto, 3,874,058.

Simmons, Kenneth I., Jr. Application of tread strip to tire casing. 3,874,974, Cl. 156-405.000.

Simon, Hans. Spring contact for establishing electric plug-in connections. 3,874,769, Cl. 339-217.00S.

Simon, Stefan, to Carl Hahn GmbH. Apparatus for the manufacture of rolls from batting. 3,874,031, Cl. 19-144.500.

Simon, Stefan; and Jolst, Wolfgang, to Dr. Carl Hahn GmbH. Method and apparatus for the manufacture of tampons. 3,874,032, Cl. 19-144.500.

Simonidesz, Vilmos: *See—*
Stadler, Istvan; Kovacs, Gabor; Meszaros, Zoltan; Radoczi, Julia; Simonidesz, Vilmos; Szantay, Csaba; Szekely, Istvan; and Szathmary, Csaba, 3,875,003.

Simpson, Arnold J.: *See—*
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Simrad A.S.: *See—*
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Sims, Marion W., to General Electric Company. Apparatus and method for testing dynamoelectric machine rotors. 3,875,511, Cl. 324-158.0MG.

Singer Company, The: *See—*
Cook, Albert N.; and Suchsland, Alfred R., 3,874,312.

Sinz, Karl, to Moto Meter GmbH. Chart carrier and chart for recording multiple operations and particularly for recording a pair of interrelated operations. 3,875,575, Cl. 346-44.000.

Sisson, Jeffery L., to Xerox Corporation. Improved registration edge for automatic document handler. 3,874,651, Cl. 271-4.000.

Sjovall, Stig Lennart, to Svenska Sockerfabriks AB. Agricultural machine. 3,874,469, Cl. 180-12.000.

SKF Industrial Trading and Development Company B.V.: *See—*
Ernst, Horst; Olschewski, Armin; and Brandenstein, Manfred, 3,874,028.

Skinner, Charles Arthur, to Baxter Laboratories, Inc. Electric heating element with a socket assembly. 3,875,371, Cl. 219-404.000.

Skinner, Dean W.: *See—*
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Skinner, Harry W.; and Orn, Max D., to said Skinner, by said Orn. Method of pipe joint sealing. 3,874,063, Cl. 29-450.000.

Skinner, Harry W.: *See—*
Skinner, Harry W.; and Orn, Max D. (assors. to said Skinner, by said Orn), 3,874,063.

Skoibeda, Anatoly Tikhonovich: *See—*
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Slack, Charles Roger: *See—*
Glasziou, Kenneth Trevor; and Slack, Charles Roger, 3,875,009.

Slasor, James Francis; and Keen, Bruce Henry, to British Insulated Callender's Cables Limited. Method and apparatus for drawing off wire or other filamentary material from an annular container. 3,874,611, Cl. 242-129.000.

Smeltzer, Paul W.: *See—*
Wogoman, Frank W.; and Smeltzer, Paul W., 3,874,022.

Smilg, Benjamin: *See—*
Isaacson, Max; and Smilg, Benjamin, 3,874,378.

Smith, Fred R. Self-maintaining poultry waterer. 3,874,344, Cl. 119-78.000.

Smith, Frederick: *See—*
Seifert, Lester H.; Powers, Raymond P.; Schmidt, William M.; Thorwaldsen, Stanley E.; Smith, Frederick; McElroy, David; and Dunton, Roy P., 3,874,149.

Smith, Frederick W.: *See—*
Seifert, Lester H.; Powers, Raymond P.; Schmidt, William M.; Thorwaldsen, Stanley E.; Smith, Frederick W.; McElroy, David C.; and Dunton, Roy P., 3,874,151.

Smith, George O., to General Motors Corporation. Oleo-pneumatic shock absorber. 3,874,485, Cl. 188-298.000.

Smith, Glendon C.: *See—*
Mauch, Hans A.; Smith, Glendon C.; and Bennett, Richard, 3,874,097.

Smith, Howard J. L., to Dzus Fastener Co. Inc. Fasteners. 3,874,041, Cl. 24-221.00R.

Smith, James E.: *See—*
Blair, Lloyd R.; Meyer, Robert E.; Rose, Dennis H.; Smith, James E.; and Steinfeldt, Jack E., 3,874,621.

Smith, Joseph E., to Wolverine-Pentronix, Inc. Boat steering and reversing system. 3,874,321, Cl. 115-35.000.

Smith, Kent F.: *See—*
Huber, Robert J.; and Smith, Kent F., 3,874,937.

Smith, Rex Duane. Game board apparatus. 3,874,671, Cl. 273-134.0AC.

Smith, Richard S., to Seek-A-Leak, Inc. Leak detecting apparatus. 3,874,224, Cl. 73-40.000.

Smith, Stephen H.: *See—*
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Smith, William Merdoc: *See—*
Richardson, Robert Harold; Smith, William Merdoc; and Davis, Robert Carlton, 3,875,461.

Smith, Willis R.; and Turner, Daniel E., to General Signal Corporation. Noise suppression system for car retarders. 3,874,298, Cl. 104-26.00A.

Smithkline Corporation: *See—*
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Baum, Ronald, 3,874,381.

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Sobel, Herbert S.: *See—*
Shapiro, Gerald N.; and Sobel, Herbert S., 3,875,391.

Sobel, P. Brav. Massaging apparatus. 3,874,373, Cl. 128-49.000.

Sobieski, James F.: *See—*
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Societa Italiana Resine S.I.R. S.p.A.: *See—*
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Cocuzza, Gioacchino; Montoro, Italo; and Calcagno, Benedetto, 3,875,019.
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Societe Anonyme dite: Etablissements A. Voisin: *See—*
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Societe Anonyme Products Chimiques Ugine Kyhlman: *See—*
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Societe Dauphinoise Electrique: *See—*
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Societe dite: RICHIER: *See—*
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Societe Generale de Constructions Electriques et Mecaniques (Alsthom): *See—*
Hirsch, Jean-Jacques, 3,875,528.

Societe Generale De Constructions Electriques et Mechaniques (Alsthom): *See—*
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Societe Honeywell Bull (Societe Anonyme): *See—*
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Societe Nationale d'Etude et de Construction de Moteurs d'Aviation: *See—*
Germain, Roger Louis; Rouger, Henri Andre; Vives, Jean-Paul; and Duquenne, Claude, 3,874,674.
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Socotel Societe Mixte pour le Developpement de la Technique de la Commutation dans le Domaine des Telecommunications: *See—*
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Sokolovsky, Veniamin Izrailevich: *See—*
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Solar, James M.: *See—*
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Somers, Peter John: *See—*
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Somerville, Gerald H.; and Straumanis, Maris A., to Industrial Nucleonics Corporation. Control system for average value setpoint. 3,875,383, Cl. 235-151.130.

Sonetaka, Kazunori; Nishino, Atsushi; and Kumano, Hiroshi, to Matsushita Electric Industrial Company. Apparatus for preparing mineral water. 3,874,277, Cl. 99-323.100.

Sonn, Edward H.: *See—*
Roch, Gerald V.; and Sonn, Edward H., 3,874,205.

Sonoda, Ryuichi: *See—*
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Miyaoka, Senri, 3,875,446.
Yamazaki, Hiroshi; and Yamaguchi, Tadanori, 3,875,567.

Soong, William E. Handlebar fastening device for a two-wheel bicycle. 3,874,701, Cl. 280-278.000.

Sorensen, Soren Kai; Andersen, Jorgen; Johansen, Ebbe; and Lund, Jorgen Aage Preben, to Radiometer A/S. Blood analyzing method and apparatus. 3,874,850, Cl. 23-230.00B.

Sorenson, James L.: *See—*
Pannier, Karl A., Jr.; Reynolds, Gordon S.; and Sorenson, James L., 3,874,369.

Sosa Texcoco SA: *See—*
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Vera, Carlos Molina; Guzman, Carlos Vilches; and Soto-Krebs, Luis, 3,874,940.

Speich, Franz, to IMB Ingenieurburs fur Maschinenbau Jakob Muller. Apparatus for the selective holding of a to-and-fro driven control element of a textile machine in one of its terminal position. 3,875,425, Cl. 307-154.000.

Spencer Turbine Company, The: *See—*
Hunt, David H.; Allain, Raymond J.; and Maselek, Joseph E., 3,874,857.

Sperry, Philip R.; Setzer, William C.; Winter, Joseph; and Pryor, Michael J., to Swiss Aluminium Ltd. Extrusion method for high strength heat treatable aluminum alloys. 3,874,213, Cl. 72-364.000.

Sperry Rand Corporation: *See—*
McGann, Harold J.; Whalen, John F.; and Williams, Boyd K., 3,874,587.

Sperry Rand Limited: *See—*
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Speth, Peter J. Windshield wiper adapter. 3,874,019, Cl. 15-250.320.

Spicer, Denis Frank, to Texas Instruments Incorporated. Methods and apparatus for the production of semiconductor devices by electron-beam patterning and devices produced thereby. 3,875,416, Cl. 250-492.00A.

Spitzer, Eugene H.: *See—*
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Sprenger, Walter: *See—*
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Spring Associates, Inc.: *See—*
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Springer, Robert: *See—*
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Springfield Instrument Company, Inc.: *See—*
Csaposs, James; Eberhard, Heinz; and Menzer, Anton, 3,874,242.

Springmann, Hermann: *See—*
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Sprow, Earnest A.: *See—*
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Sroka, Jurgen: *See—*
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Staalkat B.V.: *See—*
Temming, Leonardus Johannes, 3,874,494.

Stader, Kenneth P.; and Le Vantine, Allan D., to Cavitron Corporation. Otoscope. 3,874,371, Cl. 128-9.000.

Stadler, Istvan; Kovacs, Gabor; Meszaros, Zoltan; Radoczi, Julia; Simonidesz, Vilmos; Szantay, Csaba; Szekely, Istvan; and Szathmary, Csaba, to CHINOIN Pharmaceutical and Chemical Works Ltd. Process for the preparation of prostaglandin. 3,875,003, Cl. 195-30.000.

Stahlecker, Fritz; and Stahlecker, Hans, to William Stahlecker GmbH. Fixedly disposed feeding and opening device for a spinning unit of an open-end spinning machine. 3,874,154, Cl. 57-58.950.

Stahlecker, Hans: *See—*
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Stal-Laval Turbin AB: *See—*
Andersson, Leif; and Hunyadi, Laszlo, 3,874,169.

Staley, David Robert, to Lancer Boss Limited. Fork lift trucks. 3,874,539, Cl. 214-674.000.

Stallion Enterprises Inc.: *See—*
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Standard Oil Company: *See—*
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White, James F.; and Rege, James R., 3,875,220.

Standard Products Company, The: *See—*
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Stander, Cornelius Marthinus, to AE & CI Limited. Effluent treatment. 3,875,031, Cl. 204-98.000.

Standex International Corporation: *See—*
Williams, Leslie G., 3,875,370.

Stange, Karl; Hofmann, Alfred; and Weiss, Hans-Peter, to Badische Anilin & Soda Fabrik Aktiengesellschaft. Composite film and sheeting. 3,874,989, Cl. 161-190.000.

Stanley-Mabo: *See—*
Quenot, Michel, 3,874,608.

Stanley Works, The: *See—*
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Shepherd, Warren Arnold, Jr.; Ketchpel, Paul Allison, Jr.; Johnson, Edward John; and Biondi, Frank George, 3,874,433.

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Gutman, Arnold D., 3,875,265.
Steinreich, Joseph S., 3,875,282.

Stauffer, Larry Ronald, to AMP Incorporated. Circular sealed connector. 3,874,761, Cl. 339-60.00R.

Stauffer, Norman L., to Honeywell Inc. Focus detecting apparatus. 3,875,401, Cl. 250-201.000.

Steckel, Douglas T.: *See—*
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Steckler, Robert, to Alcolac Inc. Sulfates of monoethylenically unsaturated alcohols and the alkenoxylated adducts of said alcohols. 3,875,202, Cl. 260-458.000.

Steckler, Robert, to Alcolac Inc. Process for preparing 2-hydroxyalkylacrylates and -hydroxyalkylmethacrylates. 3,875,211, Cl. 260-486.00B.

Steel, Francis R.: *See—*
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Steel, John Y.: *See—*
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Steigerwald, Horst L.; and Clift, Gilbert B., Jr., to Monarch Marking System Company, The. Record separating, reading, and delivering apparatus. 3,874,650, Cl. 271-4.000.

Steigerwald Strahltechnik GmbH: *See—*
Von Walter, Alfred, 3,875,366.

Stein, Lewis. Tooth treatment method. 3,874,082, Cl. 32-15.000.

Steinert, Thor W., to Kimberly-Clark Corporation. Method of insulating an electrical conductor. 3,874,961, Cl. 156-53.000.

Steinfeldt, Jack E.: *See—*
Blair, Lloyd R.; Meyer, Robert E.; Rose, Dennis H.; Smith, James E.; and Steinfeldt, Jack E., 3,874,621.

Steinreich, Joseph S., to Stauffer Chemical Co. Production of high bulk density spray dried hydrous sodium silicate. 3,875,282, Cl. 264-118.000.

Stenberg-Flygt AB: *See—*
Inglis, Douglas Johnstone, 3,875,056.

Stenersen, Erik; and Johannessen, Sverre, to Simrad A.S. Transmitter trigger circuit for echo-sounders or similar devices. 3,875,549, Cl. 340-3.00E.

Stephens, James B.; Owen, William A.; and Miller, Charles G., to Westates Space-Era Products, Inc. Fluid distribution structures. 3,874,597, Cl. 239-542.000.

Stephens, Norman Murray: *See—*
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Stephenson, Leslie: *See—*
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Stephenson, Robert L., to Allied Chemical Corporation. Unitary tongue inflator for inflatable restraint. 3,874,694, Cl. 280-150.0AB.

Sterling Drug Inc.: *See—*
Lesher, George Y.; and Brundage, R. Pauline, 3,875,172.
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Sterling Moulding Materials: *See—*
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Stern, Mark Charles, to American Telephone and Telegraph Company; and Western Electric Company. Permanent signal lockout circuit for crossbar switching systems. 3,875,342, Cl. 179-18.00F.

Sternbach, Leo Henryk: *See—*
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Stockhausen, Paul E.: *See—*
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Stolen, Rogers Hall, to Bell Telephone Laboratories Incorporated. Four photon parametric amplification in glassy optical waveguides. 3,875,422, Cl. 307-88.300.

Stone, Joseph J., to A. B. Dick Company. Method for improving performance of an ink jet bar code printer. 3,875,574, Cl. 346-1.000.

Stopek, Benjamin: *See—*
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Storch, Harold A. Roofing system. 3,874,138, Cl. 52-199.000.

Storrs, Arnold B., to Lacto Products Co., Inc. Production of cheddar cheese. 3,875,305, Cl. 426-38.000.

Story, William K., to Plasteel Industries Incorporated. Method for making an integrated reinforced plastic unit. 3,875,280, Cl. 264-92.000.

Storzinger, Thomas: *See—*
Pollinger, Hans; Wosegien, Bernd; Saumweber, Eckart; and Storzinger, Thomas, 3,874,746.

Stouthamer, Bernhard; and Kwantes, Arien, to Shell Oil Co. Dehydrogenation of alcohols to ketones. 3,875,239, Cl. 260-596.000.

Straumanis, Maris A.: *See—*
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Straus, Alan E.; Sweeney, William A.; House, Ralph; and Sharman, Samuel H., to Chevron Research Company. Polyvinyl chloride plasticized with methyl esters of organic sulfonic acid oligomer. 3,875,102, Cl. 260-30.80R.

Strebel, Siegfried: *See—*
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Strobel, Albert Frederick, to GAF Corporation. Sun-screening compounds I. 3,875,198, Cl. 260-404.500.

Stroezel, Reinhold, to Robert Bosch GmbH,. Convertible pad sander. 3,874,125, Cl. 51-170.0TL.

Strong, Kline D. Combination tobacco pipe and smoke dilution valve. 3,874,393, Cl. 131-193.000.

Stroterhoff, Howard L., to United States of America, Army. Method of making aluminized paper. 3,874,995, Cl. 162-181.00R.

Strull, Gene; Cooper, Herbert; and Grauling, Charles Herbert, Jr., to Westinghouse Electric Corporation. Antenna-coupled solid-state microwave generator systems capable of producing coherent output radiation. 3,875,513, Cl. 325-105.000.

Struss, Leigh A., to Martin Welding Inc. Cryogenic tank and tank liner with curved flanges. 3,874,545, Cl. 220-5.00A.

Strycker, Stanley J., to Dow Chemical Company, The. Substituted phenoxyalkyl quaternary ammonium compounds. 3,875,215, Cl. 260-501.150.

Stuart, Richard L.; and Tretter, Steven A., to Rixon Inc. Automatic equalizer with decision directed feedback. 3,875,515, Cl. 325-323.000.

Stuber, Wolfgang: *See—*
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Stubits, Marcella C.: *See—*
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Sturtevant Engineering Company Limited: *See—*
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Suda, Seiji; Mori, Yasunori; and Ida, Shiro, to Hitachi, Ltd. Ignition device for internal combustion engine equipped with protective device. 3,874,355, Cl. 123-148.00E.

Suga, Kazuo: *See—*
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Suhr, Robert G., to Eli Lilly and Company. N'-alkoxy sulfanilamides. 3,875,192, Cl. 260-397.70R.

Suiter, Weyman Blanchard, Jr.: *See—*
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Sullivan, Herbert J.: *See—*
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Sumitomo Chemical Company Limited: *See—*
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Sumitomo Electric Industries, Ltd.: *See—*
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Sumitomo Metal Industries Limited: *See—*
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Sumitomo Shipbuilding & Machinery Co., Ltd.: *See—*
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Sumner, Maurice N. Modular offshore structure system. 3,874,180, Cl. 61-46.500.

Sumrell, Gene: *See—*
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Sumtsov, Gennady Grigorievich: *See—*
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Sundberg, Yngve, to Allmanna Svenska Elektriska Aktiebolaget. Electric induction furnace hearth for containing metal melt. 3,875,322, Cl. 13-27.000.

Superior Brush Company: *See—*
Parker, Russell H. R., 3,874,017.

Superpart AG: *See—*
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Surdyk, Lyle V., to Collins Pine Company. Flame-retardant particleboard and process for making same. 3,874,990, Cl. 161-261.000.

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Suzuki, Atsushi: *See—*
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Suzuki, Iwao; Kamei, Takeo; and Sonoda, Ryuichi, to Sumitomo Chemical Company, Limited. Process and apparatus for producing ethylene polymer. 3,875,128, Cl. 260-86.700.

Suzuki, Kikuji; Kuroda, Hiroki; and Nabeta, Saburo, to Daiichi Seiyaku Co., Ltd. Process for the purification of trans-4-aminomethylcyclohexane carboxylic acid. 3,875,217, Cl. 260-514.00J.

Suzuki, Minoru, to Ricoh Co., Ltd. Master plate feed and discharge device for duplicating apparatus. 3,874,290, Cl. 101-132.500.

Suzuki, Teruki: *See—*
Kano, Tsuyoshi; Saitoh, Tadashi; Suzuki, Atsushi; Suzuki, Teruki; Minagawa, Shigekazu; and Otomo, Yoshiro, 3,875,456.

Suzuki, Yasushi: *See—*
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Svenska Rotor Maskiner Aktiebolag: *See—*
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Svenska Sockerfabriks AB: *See—*
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Svensson, Lars Erik. Light beam apparatus. 3,875,403, Cl. 250-209.000.

Svensson, Stig, to Aktiebolaget Svenska Flaktfabriken. Swinging and locking device, particularly for vapour escape hoods at kitchen ranges. 3,874,803, Cl. 403-92.000.

Swallow, Roger T.: *See—*
Patience, Donald; Swallow, Roger T.; Hartigan, Edward G.; and Knohl, Herbert, 3,874,001.

Swanson, Floyd R., Jr. Apparatus for storing, transporting, mixing and delivering blasting material. 3,874,601, Cl. 241-101.700.

Sweeney, Gerald T., to Tigre Tierra, Inc. Processing of drilling an earth formation. 3,874,464, Cl. 175-58.000.

Sweeney, Thomas E.; and Nixon, Walter B. Windmill blade. 3,874,816, Cl. 416-139.000.

Sweeney, William A.: *See—*
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Swidler, Ronald; Sanderson, William A.; and Mueller, William A., to Cotton Incorporated. Rendering fibrous material flame retardant. 3,874,912, Cl. 117-136.000.

Swiger, Roger T., to General Electric Company. Amidomethylene modified aromatic carbocyclic polymers and methods for making the same. 3,875,114, Cl. 260-47.0XA.

Swiss Aluminium Ltd.: *See—*
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Swoboda, John J., Jr.; and Swoboda, Norman L. Racking arm for pipe sections, drill collars, riser pipe, and the like used in well drilling operations. 3,874,518, Cl. 214-1.00P.

Swoboda, Norman L.: *See—*
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Sy, Max-Heinz; and Holdt, Bernd-Dieter, to Henkel & Cie GmbH. Preserving compositions for cut flowers. 3,874,871, Cl. 71-68.000.

Sybron Corporation: *See—*
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Symann, Heinz-Georg, to Kupplungstechnik GmbH. Shaft couplings. 3,874,195, Cl. 64-11.00R.

Syncro Corporation: *See—*
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Syva Company: *See—*
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Szantay, Csaba: *See—*
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Szekessy, Istvan, to Rexroth und Szekessy Entwicklung GmbH. Circuit system for brake lights. 3,875,559, Cl. 340-71.000.

Tabet, Michael A., to Hughes D. Burton, a part interest. Cooling device for fluid of a motor vehicle transmission. 3,874,183, Cl. 62-3.000.

Tabo Industriugnar AB: *See—*
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Takahashi, Kazutoshi: *See—*
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Takahashi, Yasuhiro: *See—*
Yamashita, Tadashi; and Takahashi, Yasuhiro, 3,875,581.

Takamatsu, Ikuo, to Yoshida Kogyo K.K. Pressure sealing slide fastener. 3,874,037, Cl. 24-205.10R.

Takamatsu, Ikuo, to Yoshida Kogyo Kabushiki Kaisha. Sliding clasp coupling elements. 3,874,038, Cl. 24-205.13R.

Takamatsu, Ikuo, to Yoshida Kogyo K.K. Slide fastener stringer with scoops fabricated of a continuous filament. 3,874,039, Cl. 24-205.13C.

Takamatsu, Yukio: *See—*
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Takao, Hiroshi: *See—*
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Takashashi, Hironori: *See—*
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Takayama, Katuki, to Aisin Seiki Kabushiki Kaisho. Hydraulic brake pressure control system. 3,874,742, Cl. 303-21.00F.

Takayuki Masuda: *See—*
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Takeda, Masashi: *See—*
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Takeda, Mutsuhiko: *See—*
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Tamura, Nobuhiro; Suga, Kazuo; and Kominami, Naoya, to Asahi Kasei Kogyo Kabushiki Kaisha. Extractive recovery of palladium catalyst in the presence of nitric acid from the residue of an aryl ester distillation. 3,875,020, Cl. 203-43.000.

Tamura, Ryoichi; Okada, Masayasu; Takase, Mituo; and Yamabe, Masahiro, to Hitachi, Ltd. Francis type runner for pump turbine. 3,874,819, Cl. 416-186.000.

Tanaka, Masaru, to Matsushita Electric Industrial Co., Ltd. AC power source voltage regulator including outward voltage slope control. 3,875,367, Cl. 219-131.0WR.

Tanaka, Satoshi: *See—*
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Tashiro, Kijuro; Yokoyama, Masuzo; Kitagawa, Sadao; and Masukawa, Shoichi, to Mitsubishi Petrochemical Company Limited. Production of alpha-olefin polymers. 3,875,126, Cl. 260-88.20R.
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Thayer, William J., to Moog Inc. Multiple tow-stage electrohydraulic servovalve apparatus. 3,874,405, Cl. 137-596.160.
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Thiel, Frank L., to Corning Glass Works. Coupler for optical communication system. 3,874,781, Cl. 350-96.00C.
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Thompson, James C. Shield for controlling road spray. 3,874,697, Cl. 280-154.50R.
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Toyo Kogyo Co., Ltd.: *See—*
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Gordon, Bernard L.; and Stamps, James C. Television noise reduction device. 3,875,584, Cl. 358-36.000.
Proch, George Eugene. Digital transmitter for data bus communications system. 3,875,332, Cl. 178-58.00A.
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Schumacher, Larry L. Wide angle sun sensor. 3,875,404, Cl. 250-211.00R.
Wallace, Gabriel R.; Salter, William E.; Weathers, Glenn D.; and Gussow, Sidney S. Pseudo-noise test set for communication system evaluation. 3,875,500, Cl. 324-57.0PS.
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Van Suchtelen, Jaap; Van Rien, Adrianus M. J. G.; and Van Hoot, Leonardus A. H., to U.S. Philips Corporation. Device for converting an input quantity of one kind into an output quantity of another kind. 3,875,409, Cl. 250-370.000.

Van't Hof, Hendrik A.: *See—*
Hobbs, Charles C.; and Van't Hof, Hendrik A., 3,875,225.

Varian Associates: *See—*
Bell, Ronald L., 3,875,448.

Varteressian, Levon Antoine. Articulated head and neck protector apparatus. 3,873,996, Cl. 2-3.00R.

Vassiliades, Anthony E.; Vincent, David N.; and Powell, Mabrin P., to Champion International Corporation. Formation of microcapsules by interfacial cross-linking of emulsifier, and microcapsules produced thereby. 3,875,074, Cl. 252-316.000.

Vaught, Ronald R. Concrete mold form wale connector. 3,874,627, Cl. 249-219.00W.

Veatch, Fred C.: *See—*
Clark, Charles R.; Gregory, M. Duane; Kerfoot, Oliver C.; Veatch, Fred C.; Krehbiel, Delmar D.; and Kennedy, Carl D., 3,874,454.

VEB Plauener Spritze: *See—*
Scholtis, Walter; Wallisch, Hans; Stuber, Wolfgang; and Fentos, Sabine, 3,874,958.

Vector General, Inc.: *See—*
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Velcon Filters, Inc.: *See—*
Luten, Robert H.; and Taylor, Lucian W., 3,875,388.

Velo-Bind, Inc.: *See—*
Abildgaard, William H.; and Groswith, Charles T., III, 3,874,705.

Venor, William J.; Hoppe, John C.; and Blount, William W., Jr., to Eastman Kodak Company. Photographic elements with a support comprising polymeric propylene compositions. 3,874,880, Cl. 96-87.00R.

Ventre, Daniel B.: *See—*
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Venzel, Leonid Isaakovich: *See—*
Lapitsky, Igor Nikolaevich; Sabadakh, Bogdan Vasilievich; Sumtsov, Gennady Grigorievich; Xenevich, Ivan Pavlovich; Skoibeda, Anatoly Tikhonovich; Venzel, Leonid Isaakovich; Tolstoguzov, Viktor Sergeevich; Shneiser, Boris Yakovlevich; and Korolkevich, Alexandr Viktorovich, 3,874,251.

Vera, Carlos Molina; Guzman, Carlos Vilches; and Soto-Krebs, Luis, to Compania de Aero del Pacifico S.A.(Chile). Cementation process. 3,874,940, Cl. 75-109.000.

Verakas, John P. Chemical thermal pack. 3,874,504, Cl. 206-219.000.

Verderevsky, Vadim Anatolievich: *See—*
Nosal, Vsevolod Vladimirovich; Verderevsky, Vadim Anatolievich; Sokolovsky, Veniamin Izrailevich; and Platov, Vladimir Pavlovich, 3,874,212.

Verdugo, Alfonso Landa: *See—*
Lonchamp, Daniel; Van Landeghem, Hugo; Sanchez, Claudio Santillan; and Verdugo, Alfonso Landa, 3,875,052.

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Vermeerbergen, Leon Roger: *See—*
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Vernaleken, Hugo: *See—*
Bockmann, August; Margotte, Dieter; Rudolph, Hans; and Vernaleken, Hugo, 3,875,112.
Margotte, Dieter; Lachmann, Burkhard; Vernaleken, Hugo; Rudolph, Hans; and Cohnen, Wolfgang, 3,875,123.
Nouvertne, Werner; Muller, Peter Rolf; Peilstocker, Gunter; and Vernaleken, Hugo, 3,875,107.

Vernier, Pierre, to ARFINA Anstalt fur continentale und Vebersee-Finansinteressen. Vibration insulators. 3,874,646, Cl. 267-136.000.

Verrier, Jean: *See—*
Belloc, Andre; Florent, Jean; Lunel, Jean; Mancy, Denise; and Verrier, Jean, 3,875,005.
Belloc, Andre; Florent, Jean; Mancy, Denise; and Verrier, Jean, 3,875,006.

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Victor Company of Japan, Ltd.: *See—*
Matsumoto, Shigeru, 3,874,577.

Vietor, Carl W. Terminal airways traffic control system. 3,875,379, Cl. 235-150.220.

Vik, Albam M., to Dempco, Inc. Hydraulic coupler attachment. 3,874,411, Cl. 137-614.060.

Vinals, Joaquin F.: *See—*
Wolt, John; Giacino, Christopher; Quinn, Alton Dewitt; Shuster, Edward J.; and Vinals, Joaquin F., 3,875,307.

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Vincent, David N.: *See—*
Vassiliades, Anthony E.; Vincent, David N.; and Powell, Mabrin P., 3,875,074.

Vines, George Ross. Printing machine. 3,874,576, Cl. 226-59.000.

Virginia Chemicals Inc.: *See—*
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Vischer, Ernst: *See—*
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Vives, Jean-Paul: *See—*
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Vogel, Christian: *See—*
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Vogel, Hans: *See—*
Schmitt, Albert; Vogel, Hans; and Tomoff, Toma, 3,874,794.

Voisin, Albert S., to Societe Anonyme dite: Etablissements A. Voisin. Moulds for producing light alloy and other castings. 3,874,440, Cl. 164-306.000.

Volinskie, Robert, to AMP Incorporated. Lead assembly. 3,874,764, Cl. 339-97.00R.

Volpp, Gert Paul; and Dounchis, Harry, to FMC Corporation. Herbicidal compositions based on 1,2,3-thiadiazol-5-yl ureas. 3,874,873, Cl. 71-90.000.

Volume Products Company, Inc.: *See—*
Cronan, Walter I., 3,874,508.

Von Bebenburg, Walter; and Offermanns, Heribert, to Deutsche Gold-und-Silber-Scheideanstalt vormals Roessler. 2-Benzoyl -3-aminopyridines. 3,875,176, Cl. 260-296.00R.

von Besser, Kurt. Ski binding apparatus and method of mounting. 3,874,685, Cl. 280-11.35K.

Von Brimer, Joe W. Linear self synchronous electromagnetic drive system for a sewing machine. 3,875,489, Cl. 318-691.000.

Von Loewis, Alexander, to Robert Bosch GmbH. Control valve assembly. 3,874,406, Cl. 137-596.170.

von Praun, Ferdinand; and Kosswig, Kurt, to Chemische Werke Huels, A.G. Washing and cleaning agent containing a sulfonated polybutadiene builder salt. 3,875,070, Cl. 252-97.000.

Von Walter, Alfred, to Steigerwald Strahltechnik GmbH. Method and apparatus for regulating the beam current in industrial charge carrier beam apparatus. 3,875,366, Cl. 219-121.0EM.

Voronkova, Tamara Georgievna: *See—*
Dalmatov, Vsevolod Yakolevich; Kim, Inna Pavlovna; Voronkova, Tamara Georgievna; and Moschansky, Nikolai Alexeevich, 3,874,887.

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W. R. Grace & Co.: *See—*
Cogliano, Joseph A.; Wood, Louis L.; and Frisch, Kurt C., 3,874,964.
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W. Schlafhorst & Co.: *See—*
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Wacker-Chemie GmbH: *See—*
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Wacker-Chemitronic: *See—*
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Waddicor, Andrew Hurlstone: *See—*
Eccles, Edward Stuart; Waddicor, Andrew Hurlstone; Roberts, Eric; and McNamara, John, 3,875,390.

Waddill, Harold George, to Jefferson Chemical Company, Inc. Piperazine and alkanolamine accelerator for epoxy curing. 3,875,072, Cl. 252-182.000.

Waddington, Clive. Waddington drive. 3,874,253, Cl. 74-804.000.

Waddington, William T.; and Mazzeo, Charles F., to Amerace Corporation. Wire connector. 3,875,324, Cl. 174-87.000.

Wade, John M.; Huff, Donald W.; and Furman, Jeffrey D., to Hewlett-Packard Company. Amplifier circuit for graphical recorder. 3,875,523, Cl. 330-69.000.

Wadley, Clark Searle; and Kenney, Donald Sykes, to Abbott Laboratories. Applicator for uniformly applying a sample to bacterial growth media. 3,875,015, Cl. 195-127.000.

Wagner, Lawrence R.; and Mach, Joe A. Wire support for use in installing wire to a fence post. 3,874,640, Cl. 256-47.000.

Wagner, Theodor. Guiding attachment for heddle supporting shaft. 3,874,419, Cl. 139-91.000.

Wahl, Josef: *See—*
Schmidt, Peter; Kizler, Harald; Maisch, Wolfgang; Peter, Bernd; Wahl, Josef; Linder, Ernst; and Neidhard, Horst, 3,874,171.

Wahlberg, Eric C. Powered fishing reel. 3,874,610, Cl. 242-84.10A.

Waight, William J.; Williams, John A.; Garday, Louis C., deceased; and Garday, Johnnie A., legal representative, to Lockheed Aircraft Corporation. Check valve. 3,874,404, Cl. 137-493.000.

Waite, Ralph D.: *See—*
Harland, Philip W.; and Waite, Ralph D., 3,874,241.

Wakao, Mitsuru: *See—*
Sema, Katsutosh; Wakao, Mitsuru; Kobayashi, Yoshinori; and Hara, Koichi, 3,874,305.

Wallace, Gabriel R.: *See—*
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Wallisch, Hans: *See—*
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Wallshein, Melvin. Buccal end tube. 3,874,080, Cl. 32-14.00A.

Walsh, Frederick Bartholomew; and Grennan, Leslie Laurence. Children's or infant's furniture. 3,874,011, Cl. 5-108.000.

Walters, Ronald Bernard, to Sperry Rand Limited. Hydraulic actuator controls. 3,874,269, Cl. 91-433.000.

Walther, Herbert C., Jr., to Continental Oil Company. Diffusion barrier chamber for sperry sun permagage type pressure gage. 3,874,231, Cl. 73-151.000.

Wandel u. Goltermann: *See—*
Harzer, Peter; and Hoffman, Gunther, 3,875,524.

Wang, Taylor G.: *See—*
United States of America, National Aeronautics and Space Administration; Wang, Taylor G.; Saffren, Melvin M.; and Elleman, Daniel D., 3,875,435.

Wang, Yen. Reusable envelope. 3,874,582, Cl. 229-73.000.

Wanner, Karl: *See—*
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Warburton, Geoffrey Greenwood: *See—*
McKellar, John Forgie; and Warburton, Geoffrey Greenwood, 3,874,884.

Ward, Maurice Miller. Grinding machine. 3,874,122, Cl. 51-111.00R.

Ware, James M.: *See—*
Kiefer, Frank I., Jr.; Clark, Billy R.; and Ware, James M., 3,875,021.

Warnberg, Archie E. Water closet seats and covers therefor. 3,874,008, Cl. 4-234.000.

Warneke, Carl J., deceased (by Warneke, Mabel P., administratrix), to Sherwin-William Company, The. Apparatus for curing photopolymerizable film forming polymer coatings. 3,875,418, Cl. 250-527.000.

Warneke, Mabel P., administratrix: *See—*
Warneke, Carl J., deceased, 3,875,418.

Warren, Carlton J., to Sybron Corporation. Ratio computing circuit. 3,875,519, Cl. 328-161.000.

Warren, Roger Hill: *See—*
Wingfield, Peter Maurice, deceased; and Warren, Roger Hill, 3,875,381.

Wasa, Kiyotaka; Hosomi, Fumio; and Hayakawa, Shigeru, to Matsushita Electric Industrial Co., Ltd. Display panel. 3,875,442, Cl. 313-193.000.

Wasserman, Steven A. Bicycle rack. 3,874,575, Cl. 224-42.03B.

Watanabe, Koichiro; and Urano, Fumio, to Asahi Kogaku Kogyo Kabushiki Kaisha. Structure for preventing faulty camera operation. 3,875,580, Cl. 354-268.000.

Watanabe, Mitsuru: *See—*
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Watanabe, Shigeru: *See—*
Maio, Kenji; Watanabe, Shigeru; and Yokozawa, Norio, 3,875,378.

Watanabe, Takayuki, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Device for preventing the swaying of the suspending means in a crane. 3,874,516, Cl. 212-87.000.

Watanabe, Tatsuya: *See—*
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Watanabe, Toshihiko: *See—*
Arikawa, Masayasu; Watanabe, Toshihiko; and Kano, Motomi, 3,875,363.

Watanabe, Yoshio. Spare tire holder for an automobile. 3,874,536, Cl. 214-451.000.

Watarai, Syu; Seoka, Yoshio; and Ono, Hisatake, to Fuji Photo Film Co., Ltd. Sensitizers for electrophotography. 3,874,943, Cl. 96-1.600.

Waters, Robert S.; and Shortlidge, Donald L., to Schick Incorporated. Auxiliary trimmer assembly for an electric shaver. 3,874,079, Cl. 30-34.100.

Watkins, Lucius D., to Permtek, Inc. Packaging apparatus. 3,874,146, Cl. 53-182.000.

Watson, David G., to Eagle-Picher Industries, Inc. Crimp-on clamp for flexible duct. 3,874,712, Cl. 285-236.000.

Wayne, Robert J.: *See—*
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Weatherchem Corporation: *See—*
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Weatherhead, Albert J., III, to Weatherchem Corporation. Container end closure. 3,874,580, Cl. 229-5.500.

Weatherhead Company, The: *See—*
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Weathers, Glenn D.: *See—*
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Weaver, Richard L. Apparatus for discharging silage from a silo. 3,874,524, Cl. 214-17.0DA.

Weaver, William N., to Illinois Tool Works Inc. Multiple container carrier and package. 3,874,502, Cl. 206-150.000.

Webb, Stephen R., to Illuminite Corporation. Illuminated clipboard. 3,875,396, Cl. 240-6.40B.

Weber, Guy Paul, to La Cellophane. Apparatus for reading and electrophotographic reproduction of microphotographs. 3,874,789, Cl 355-5.000.

Weber, John Herbert: *See—*
Benjamin, John Stanwood; Cairns, Robert Lacock; and Weber, John Herbert, 3,874,938.

Weber, Max, to Elcalor AG, Fabrik fur Elektrothermische Apparate. Bottle sorting apparatus. 3,874,226, Cl. 73-45.200.

Webster, John L., to Reynolds Metals Company. Building construction. 3,874,131, Cl. 52-11.000.

Weed, Lucretia J., to Polaroid Corporation. Diffusion transfer processes employing permanent laminate film units. 3,874,944, Cl. 96-29.00R.

Wegley, Jack H.; and Foraker, John C. Multi-sided storage rack for skis or similar articles. 3,874,512, Cl. 211-163.000.

Wehle, Volker: *See—*
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Wehrli, Hansuli; and Jeger, Oskar, to Ciba-Geigy Corporation. 14 Beta,18-(epoxyethanoimino) steroides. 3,875,143, Cl. 260-239.500.

Weigert, Wolfgang: *See—*
Hein, Hilmar; Janzon, Karlheinz; Weigert, Wolfgang; Liedtke, Christa; and Muller, Rudolf, 3,875,186.

Weihl, Donald E. Automated firing range. 3,874,670, Cl. 273-105.600.

Weil, Edward D., to Hooker Chemical Corporation. Polyvinyl halide thioether polymers. 3,875,084, Cl. 260-2.0EC.

Weiland, Rolf-Jurgen, to Siemens Aktiengesellschaft. Dental patients chair with a parallelogram supporting arm. 3,874,728, Cl. 297-330.000.

Weinrotter, Ferdinand; Schmidt, Alfred; and Gauster, Wolfgang, to Osterreichische Stickstoffwerke Aktiengesellschaft. Process for the production of malic acid. 3,875,222, Cl. 260-535.00P.

Weis, Walter W., Jr.: *See—*
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Weiss, Hans-Peter: *See—*
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Welch, Rolland; Springer, Robert; Mayberry, Brian; and Sheppard, Robert, to Optical Recognition Systems, Inc. Document sorting system. 3,874,653, Cl. 271-64.000.

Welding Engineers, Inc.: *See—*
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Wellach, Dieter: *See—*
Dogl, Ernst; Funck, Albrecht; Wellach, Dieter; and Winkler, Hans-Georg, 3,874,391.

Wells Electronics, Inc.: *See—*
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Wells, James Rutherford: *See—*
Cunningham, Sinclair Upton; Wells, James Rutherford; and Firth, Donald, 3,874,275.

Weltin, Carl; and Pomiczinski, Horst, to Bayer Aktiengesellschaft. Retaining structure for frames of multi-electrode electrolysis apparatus. 3,875,040, Cl. 204-267.000.

Wendt, Michael E.: *See—*
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Wenner-Gren Medical Laboratory Aktiebolag Sturegatan: *See—*
Alstrom, Eric Ingemar, 3,875,306.

Wenstrom, Richard T.; Reinke, Theodore S.; Tolley, Calvert B.; and Brooks, J. Clayton, to Sea Savory, Inc. Method for separating edible crab meat from non-edible portions of cooked crabs. 3,875,050, Cl. 209-11.000.

Wentworth, Gary, to Monsanto Company. Spinning epoxide containing acrylics into baths containing polyhydroxyls. 3,875,283, Cl. 264-182.000.

Werner, David, to Salco Products Incorporated. Emitter valve for soil irrigation. 3,874,591, Cl. 239-106.000.

Werner Glatt: *See—*
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Werner, John A. Spinning adapter. 3,874,208, Cl. 72-84.000.

Werneth, Charles J.: *See—*
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Wernick, Jack Harry: *See—*
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Wesgh, Ludwig, to Mancar-Trust. Process for the manufacture of improved reinforced glass pipes and other articles. 3,874,972, Cl. 156-169.000.

West Virginia High Bird Corp.: *See—*
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Westates Space-Era Products, Inc.: *See—*
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Westdorp, W. Alfred: *See—*
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Western Company of North America, The: *See—*
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Western Electric Company: *See—*
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Wheaton, Frank J. Fishing rod holder and signal device. 3,874,107, Cl. 43-17.000.

Whirlpool Corp.: *See—*
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White, Charles S. Method of making a bearing. 3,874,050, Cl. 29-149.50B.

White, Dwain M., to General Electric Company. Bis(polyphenylene)-carbonate block copolymers. 3,875,256, Cl. 260-860.000.

White, James F.; and Rege, James R., to Standard Oil Co., The. Process for the preparation of methacrylic acid from methacrolein. 3,875,220, Cl. 260-530.00N.

White, Laniel B., to Mobil Oil Corporation. Method and apparatus for motor-starting control. 3,875,487, Cl. 318-485.000.

White, Lyall B., to Minnesota Mining and Manufacturing Company. Apparatus for marking paved surfaces. 3,874,801, Cl. 401-2.000.

White, Robert J., to Chevron Research Company. Synthesis gas manufacture. 3,874,116, Cl. 48-209.000.

Whitehurst, Darrell Duayne, to Mobil Oil Corporation. Sorbent for heavy metals. 3,875,125, Cl. 260-79.50R.

Whiteley, James: *See—*
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Wilcox, Raymond J. Method of making vehicle wheel. 3,874,055, Cl. 29-159.010.

Wilder, Gene R., to Monsanta Company. N-tert-alkylamino pyrrolidinylthiocarbonyl sulfides. 3,875,124, Cl. 260-79.50B.

Wildschutz, Erwin, to Mannesmann Aktiengesellschaft. Method of preparing iron silicon alloys with high silicon content for cold working requiring ductility. 3,874,954, Cl. 148-111.000.

Wilkins, Bernard Charles. Hydrostatic power transmission system. 3,874,173, Cl. 60-420.000.
Wilkins, Robert John; and Hurvitz, Arthur. Method and apparatus for the detection of microfilariae. 3,874,851, Cl. 23-230.00B.
Will, Fritz G., to General Electric Company. Hermetically sealed secondary battery with lanthanum nickel anode. 3,874,928, Cl. 136-6.00R.
Willard, John W., Sr., to CAW Industries, Inc. Method of washing soiled culinary articles. 3,874,927, Cl. 134-25.00A.
Willcox, Dale F., to Furnas Electric Company. Diaphragm snap pressure switch. 3,875,358, Cl. 200-83.00P.
William Prym, Inc.: *See—*
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Williams, Don W., to Floren Klopfenstein. Monitoring system. 3,875,560, Cl. 340-80.000.
Williams, James Luchin: *See—*
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Williams, John A.: *See—*
Waight, William J.; Williams, John A.; Garday, Louis C., deceased; and Garday, Johnnie A., legal representative, 3,874,404.
Williams, John Llewellyn; and Harte, Ralph James, to British Nuclear Fuels Limited. Travelling field electric motor with improved stator. 3,875,484, Cl. 318-220.00R.
Williams, Leslie G., to Standex International Corporation. Heat-retaining food service unit. 3,875,370, Cl. 219-386.000.
Williams, Lester A.: *See—*
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Williams, Thomas C. Trailer Hitch. 3,874,704, Cl. 280-479.00R.
Willkie, Philip H.: *See—*
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Wilson, Perry A. Trailer moving device. 3,874,639, Cl. 254-100.000.
Wilson, Ray. Crane structure. 3,874,513, Cl. 212-11.000.
Wilson, Ray. Crane arrangement and ladle structure. 3,874,514, Cl. 212-21.000.
Wilt, Theodore G. Spray support frame. 3,874,593, Cl. 239-166.000.
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Windheuser, John J., to Interx Research Corporation. Useful tetraalkyl diamines in the treatment of poison ivy. 3,875,301, Cl. 424-45.000.
Wing, Malcolm E.: *See—*
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Winter, Joseph: *See—*
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Wintersteller, Karl F. Exercise apparatus for skiers. 3,874,656, Cl. 272-58.000.
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Wirth, Robert Benson. Electric cord retrieving device. 3,874,488, Cl. 191-12.00R.
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Wistreich, Hugo E.; and Juhn, Hyunil, to B. Heller & Company. Liquid smoke and method for manufacture. 3,875,314, Cl. 426-342.000.
Witt, Donald R., to Phillips Petroleum. Large pore silicas. 3,875,079, Cl. 252-451.000.
Wogoman, Frank W.; and Smeltzer, Paul W., to Wells Electronics, Inc. Means for removing ink from a screen and including a cleaning head and accumulator. 3,874,022, Cl. 15-321.000.
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Wood, Gillies; and Klee, John Michael. Take down apparatus for circular knitting machines. 3,874,200, Cl. 66-149.00S.
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Woodall, Jerry M., to International Business Machines Corporation. Method of doping during epitaxy. 3,874,952, Cl. 148-171.000.
Woodard, Boyd. Cable pulley drive device. 3,874,246, Cl. 74-224.000.
Woodard, Ollie C., to International Business Machines Corporation. Method and apparatus for detecting a registration mark on a target such as a semiconductor wafer. 3,875,415, Cl. 250-492.000.
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Wooldridge, Kenneth Robert Harry; and Basil, Berkeley, to May & Baker Limited. Oximes of 1-(ortho-acyl-phenoxy)-2-hydroxy-3-aminopropanes. 3,875,149, Cl. 260-240.00G.
Woosley, Robert Dale: *See—*
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Yagi, Takashi; Nanai, Sadaaki; Ouhara, Souji; and Shirakawa, Yukihiro, to Kabushiki Kaisha Yaskawa Denki Seisakusho. System for working cylinders along a line of intersection. 3,875,468, Cl. 318-575.000.
Yale, Harry L.; and Petigara, Ramesh B., to E. R. Squibb & Sons, Inc. 3-(Aminoalkoxy)-2,3-dihydroquinobenzoxa(or thia) zepine derivatives. 3,875,166, Cl. 260-288.00R.
Yale, Harry Louis; and Petigara, Ramesh B., to E. R. Squibb & Sons, Inc. Certain 6H-pyrimido[1,2-c][1,3,5]benzothiadiaza compounds. 3,875,162, Cl. 260-256.50R.
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Yamada, Hiroshi, to Takayuki Masuda. Self-acting waterspout device. 3,874,589, Cl. 239-21.000.
Yamada, Koichi; Ueki, Hiromi; Masuda, Koichiro; and Tasaka, Katsuhiko, to Mitsui Petrochemical Industries, Ltd. Hot melt compositions comprising elva and a hydrocarbon copolymer. 3,875,095, Cl. 260-28.5AV.
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Yamamoto, Michihiro: *See*—
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Yamazaki, Hiroshi; and Yamaguchi, Tadanori, to Sony Corporation. Memory circuit using variable threshold level field-effect device. 3,875,567, Cl. 340-173.00R.
Yanov, David A.: *See*—
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Yoshida, Shuji; and Iguchi, Tateo, to Denki Kagaku Kogyo Kabushiki Kaisha. Thermoplastic resin-graft polyblend compositions. 3,875,259, Cl. 260-876.00R.
Yoshikawa, Kiichi, to Yoshida Kogyo Kabushiki Kaisha. Sliding clasp fasteners. 3,874,036, Cl. 24-205.10C.
Yoshino, Masatsugu; Hashino, Yasuo; and Morishita, Masataka, to Asahi Kasei Kogyo Kabushiki Kaisha. Hollow filament containing enzymes and/or microorganisms. 3,875,008, Cl. 195-63.000.
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Young, David M. Runway approach radar reflectors. 3,875,551, Cl. 343-5.0LS.
Young, Dean Arthur, to Union Oil Company. Hydrocarbon conversion catalyst. 3,875,081, Cl. 252-455.00Z.
Young, John Wallace; Firkins, Robert Charles; Ring, Gregg; and Tatum, John A., Jr., to Randolph Company, The. Coring apparatus. 3,874,465, Cl. 175-236.000.
Young, Niels O. Positive displacement scroll apparatus with axially radiafiy compliant scroll member. 3,874,827, Cl. 418-55.000.
Young, Warren L., to Dow Chemical Company, The. Laminate of a moisture impervious polyethylene foam and a suspension chlorinated polyethylene sheet. 3,874,987, Cl. 161-160.000.
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Zackheim, Eli A.; and Silverstein, Jerome, to Jules Silver. Dispenser cup having a well therein. 3,874,561, Cl. 222-207.000.
Zangrando, Roy A. Battery filling device. 3,874,934, Cl. 136-162.000.
Zank, Gordon. Golfer's training aid. 3,874,672, Cl. 273-183.00B.
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Zara, Eugene A.; Midolo, Lawrence L.; and Savage, William C., to United States of America, Air Force. Air cycle cooling system with rotary condensing dehumidifier. 3,874,188, Cl. 62-272.000.
Zaremba, Edmund Anthony; and Cano, Francis Robert, to American Cyanamid Company. Process for the purification of virus vaccine. 3,874,999, Cl. 195-1.500.
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Zetterberg, Einar. Device for guiding and/or preliminary tightening of caps in an apparatus for closing jars or other containers with caps. 3,874,147, Cl. 53-314.000.
Zoccolini, Gino, to Saint-Gobian Industries. Apparatus for applying strips of resistive material. 3,874,330, Cl. 118-207.000.
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Zondler, Helmut: *See*—
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Zumin, Silvia Tricerri; Riva, Mario; and Iafolla, Giuseppe, to Pierrel S.p.A. Nitrogen containing acyclic isoprenoid compounds. 3,875,163, Cl. 260-268.0BC.
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PATENTS WERE ISSUED ON THE 1ST DAY OF APRIL, 1975

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Edson, Alden P., to The International Nickel Co., Inc. Magnetostrictive apparatus and process. Re. 28,381, 4–1–75, Cl. 318—118.
International Nickel Co., Inc., The: *See*—
Edson, Alden P. Re. 28,381.
Marine Construction & Design Co.: *See*—
Tison, Kenneth F. Re. 28,380.
Tison, Kenneth F., to Marine Construction & Design Co. Fish line reeling and baiting apparatus. Re. 28,380, 4–1–75, Cl. 43—6.5.

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Gruis, Jake T., and T. P. Riordan, to The O.M. Scott & Sons Co. St. Augustinegrass. 3,698, 4–1–75, Cl. 88.
Koch, Leroy J. Almond tree. 3,699, 4–1–75, Cl. 30.
Riordan, Terrance P.: *See*—
Gruis, Jake T., and Riordan. 3,698.
Scott, O. M., & Sons Co., The: *See*—
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Youdath, John A. Yew tree. 3,697, 4–1–75, Cl. 50.

LIST OF DESIGN PATENTEES

Aktiebolaget Overums Bruk: *See*—
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American Optical: *See*—
Armbruster, John T. 234,665.
Anderson, Robert K., to Valleylab, Inc. Releasable clamp for ground plate electrode. 234,695, 4–1–75, Cl. D26—1.
Annis, Sidney. Garment bag. 234,728, 4–1–75, Cl. D87—1.
Armbruster, John T., to American Optical. Back cushion for an ophthalmic chair. 234,665, 4–1–75, Cl. D6—201.
Ball, Douglas C., to Massey-Ferguson Industries Ltd. Credenza. 234,660, 4–1–75, Cl. D6—160.
Ball, Douglas C., to Massey-Ferguson Industries Ltd. Desk. 234,661, 4–1–75, Cl. D6—161.
Beeren, Aloysius-Jacobus-Maria, to U.S. Philips Corp. Spotlight. 234,710, 4–1–75, Cl. D48—20.
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Bergo, Ralph M.: *See*—
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Buckley, Berdell. Oral hygiene tool. 234,651, 4–1–75, Cl. D4—24.
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Clostermann, Friedrich. Apertured prismatic cover plate for climate lights. 234,709, 4–1–75, Cl. D48—16.
Colasante, Anthony D. Compressor housing for a sphygomanometer. 234,719, 4–1–75, Cl. D65—1.
Cole, Richard C. Fishing cruiser. 234,685, 4–1–75, Cl. D12—62.
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Ljung, Per Erik G., N. G. Lindell, and S. B. Hogdal, to Videogram Production AB. Multi-screen film projector. 234,717, 4–1–75, Cl. D61—1.
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Pycha, Charles A., and F. Wilkey, Jr., to International Business Machines Corp. Data converter for automatic data processing. 234,696, 4–1–75, Cl. D26—5.
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Rostock, Todd M. Puzzle toy. 234,708, 4–1–75, Cl. D34—15.
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CLASSIFICATION OF PATENTS

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170D 3,875,350
175.2R 3,875,352
175.3R 3,875,343
3,875,351

CLASS 180

6.48 3,874,468
12 3,874,469
14A 3,874,470
54R 3,874,471
65R 3,874,472
79.2R 3,874,473
82C 3,874,474
98 3,874,475
103 3,874,476

CLASS 182

141 3,874,477

CLASS 184

1.5 3,874,478

CLASS 186

1D 3,874,479

CLASS 188

67 3,874,480
79.5GT 3,874,481
165 3,874,482
196BA 3,874,483
197 3,874,484
298 3,874,485
314 3,874,486
322 3,874,487

CLASS 191

12R 3,874,488
12.2R 3,874,489

CLASS 193

23 3,874,490
35MD 3,874,491

CLASS 195

1.5 3,874,999
1.7 3,875,000
29 3,875,001
3,875,002
30 3,875,003
3,875,004
62 3,875,005
3,875,006
3,875,007
63 3,875,008
65 3,875,009
80R 3,875,010
99 3,875,011
103.5R 3,875,012
3,875,013
3,875,014
127 3,875,015

CLASS 197

1R 3,874,492
3,874,493

CLASS 198

30 3,874,494
137 3,874,495
158 3,874,496
204 3,874,497
254 3,874,498

CLASS 200

8A 3,875,353
11TC 3,875,354
48A 3,875,355
52R 3,875,356
83P 3,875,358
83S 3,875,359
153SC 3,875,360

CLASS 202

151 3,875,016
174 3,875,017
248 3,875,018

CLASS 203

18 3,875,019
43 3,875,020

CLASS 204

1T 3,875,021
3,875,022
2 3,875,023
5 3,875,024
18PC 3,875,025
27 3,875,026
28 3,875,027
37R 3,875,028
43S 3,875,029
67 3,875,030
98 3,875,031
109 3,875,032
157.1H 3,875,033
165 3,875,034
176 3,875,035
195P 3,875,036
3,875,037
224M 3,875,038
248 3,875,039
267 3,875,040
273 3,875,041
290F 3,875,042
3,875,043
299 3,875,044
3,875,045

CLASS 206

1.7 3,874,499
45.19 3,874,500
73 3,874,501
150 3,874,502
205 3,874,503
219 3,874,504
223 3,874,505
229 3,874,506

CLASS 208

11 3,875,046
65 3,875,047
139 3,875,048
140 3,875,049

CLASS 209

11 3,875,050
80.5 3,874,507
107 3,874,508
240 3,874,509

CLASS 210

2 3,875,051
23 3,875,052
35 3,875,053
54 3,875,054
59 3,875,357
73 3,875,055
93 3,875,056
104 3,875,057
151 3,875,058
172 3,875,059
199 3,875,060
223 3,875,061
242 3,875,062
304 3,875,063
370 3,875,064
388 3,875,065
521 3,875,066

CLASS 211

126 3,874,510
152 3,874,511
161 3,874,512

CLASS 212

11 3,874,513
21 3,874,514
49 3,874,515
87 3,874,516
89 3,874,517

CLASS 214

1P 3,874,518
1.2 3,874,519
1.5 3,874,520
6DK 3,874,521
7 3,874,522
17DA 3,874,524
17B 3,874,525
17R 3,874,523
38CA 3,874,526
77R 3,874,527
3,874,528
83.3 3,874,529
83.32 3,874,530
130R 3,874,531
138 3,874,532
145 3,874,533
302 3,874,534
450 3,874,535
451 3,874,536
501 3,874,537
516 3,874,538
674 3,874,539

CLASS 215

252 3,874,540
253 3,874,541
328 3,874,542

CLASS 217

48 3,874,543

CLASS 219

10.55 3,875,361
69G 3,875,374
69M 3,875,362
73 3,875,363
74 3,875,364
89 3,875,365
121EM 3,875,366
131WR 3,875,367
243 3,875,368
279 3,875,369
386 3,875,370
404 3,875,371
413 3,875,372
526 3,875,373

CLASS 220

3 3,874,544
5A 3,874,545
6 3,874,546
19 3,874,547
21 3,874,548
23.83 3,874,552
90.2 3,874,554
200 3,874,549
213 3,874,550
269 3,874,555
273 3,874,553
306 3,874,556

CLASS 222

80 3,874,557
92 3,874,558
146C 3,874,559
193 3,874,560
207 3,874,561
209 3,874,562
213 3,874,563
363 3,874,564
402.14 3,874,565
404 3,874,566
499 3,874,567
505 3,874,568
508 3,874,569
543 3,874,570
558 3,874,571

CLASS 223

94 3,874,572

CLASS 224

5E 3,874,573
31 3,874,574
42.03B 3,874,575

CLASS 226

59 3,874,576
90 3,874,577

CLASS 227

144 3,874,578

CLASS 229

2.5 3,874,579
5.5 3,874,580
44CB 3,874,581
73 3,874,582

CLASS 232

17 3,874,583

CLASS 234

128 3,874,584

CLASS 235

1C 3,874,585
61.11D 3,874,586
61.7B 3,875,375
92LG 3,875,377
92SB 3,875,387
92C 3,875,376
131R 3,874,587
150.2 3,875,388
150.22 3,875,379
150.5 3,875,378
151 3,875,389
151.1 3,875,380
151.11 3,875,382
151.13 3,875,383
151.21 3,875,384
151.3 3,875,381
151.35 3,875,385
152 3,875,386
153AE 3,875,390
156 3,875,391
3,875,392
176 3,875,393
181 3,875,394
183 3,875,395

CLASS 239

11 3,874,588
21 3,874,589
63 3,874,590
106 3,874,591
132.3 3,874,592
166 3,874,593
227 3,874,594
3,874,595
542 3,874,596
3,874,597
3,874,598
557 3,874,599

CLASS 240

6.4B 3,875,396
10.63 3,875,397
3,875,398

CLASS 241

46.17 3,874,600
101.7 3,874,601
186.4 3,874,602
191 3,874,603
243 3,874,604
292 3,874,605

CLASS 242

55.19A 3,874,606
67.1R 3,874,607
84.1A 3,874,610
84.8 3,874,608
86.5R 3,874,609
129 3,874,611
149 3,874,612
152.1 3,874,613
209 3,874,614
219 3,874,615

CLASS 244

17.11 3,874,616
42DA 3,874,617
50 3,874,618
3,874,619
110B 3,874,620

CLASS 246

182B 3,874,622

CLASS 248

121 3,874,623
200 3,874,624
354S 3,874,625
399 3,874,626

CLASS 249

204 3,874,628
219W 3,874,627

CLASS 250

199 3,875,399
3,875,400
201 3,875,401
203R 3,875,402
209 3,875,403
211R 3,875,404
3,875,405
231SE 3,875,406
324 3,875,407
339 3,875,408
370 3,875,409
374 3,875,410
402 3,875,411
491 3,875,412
492 3,875,413
3,875,414
3,875,415
3,875,416
506 3,875,417
527 3,875,067
3,875,418
531 3,875,068
568 3,875,419
578 3,875,420

CLASS 251

61.4 3,874,629
68 3,874,630
148 3,874,631
214 3,874,633
319 3,874,634
333 3,874,635
335A 3,874,636
345 3,874,637

CLASS 252

56S 3,875,069
97 3,875,070
106 3,875,071
182 3,875,072
188.3R 3,875,073

316 3,875,074
425 3,875,077
429B 3,875,076
429C 3,875,075
432 3,875,078
451 3,875,079
455R 3,875,080
455Z 3,875,081
518 3,875,082
535 3,875,083

CLASS 254

51 3,874,638
100 3,874,639
159 3,874,632

CLASS 256

47 3,874,640

CLASS 259

37 3,874,641
147 3,874,642
185 3,874,643

CLASS 260

2EC 3,875,084
2.1R 3,875,085
2.5AM 3,875,086
2.5H 3,875,088
2.5N 3,875,087
14 3,875,089
22TN 3,875,090
23AR 3,875,092
23EM 3,875,091
28 3,875,094
28.5AV 3,875,095
28.5D 3,875,164
29.2N 3,875,096
29.4UA 3,875,097
3,875,098
29.6TA 3,875,099
3,875,100
29.7T 3,875,101
30.8DS 3,875,103
30.8R 3,875,102
33.2R 3,875,105
33.6AQ 3,875,104
37EP 3,875,106
37PC 3,875,107
45.7P 3,875,108
45.7R 3,875,109
45.75Z 3,875,110
47CP 3,875,116
47CZ 3,875,111
47EN 3,875,113
47UA 3,875,115
47XA 3,875,112
3,875,114
67R 3,875,117
75NP 3,875,118
75T 3,875,119
78L 3,875,121
78R 3,875,120
78.04E 3,875,123
78.4D 3,875,122
79.5B 3,875,124
79.5R 3,875,125
85.5R 3,875,127
86.7 3,875,128
87.1 3,875,130
88.2R 3,875,126
92.8R 3,875,131
93.7 3,875,132
94.3 3,875,133
94.9R 3,875,134
97 3,875,135
112.5 3,875,136
3,875,137
3,875,138
146R 3,875,139
209R 3,875,140
212 3,875,141
239BD 3,875,142
239EP 3,875,145
239B 3,875,144
239.1 3,875,146
239.3R 3,875,147
239.5 3,875,143
3,875,148
239.6 3,875,150
240G 3,875,149
243A 3,875,156
243C 3,875,152
3,875,153
243R 3,875,151
3,875,154
3,875,155
246B 3,875,157
250Q 3,875,158
251QB 3,875,093
251R 3,875,159
256.4F 3,875,160
3,875,161
256.5R 3,875,162
268BC 3,875,163
287R 3,875,165
288R 3,875,166
3,875,168
289A 3,875,167
293.54 3,875,169
293.69 3,875,170
293.77 3,875,171
294.8C 3,875,173
294.8R 3,875,174
295E 3,875,175
295.5B 3,875,172
296R 3,875,176
306.6A 3,875,177
308A 3,875,178
308R 3,875,179
309.7 3,875,180
3,875,181
310R 3,875,182
326N 3,875,183
326.5FL 3,875,184
3,875,185
346.3 3,875,186
347.2 3,875,187
348A 3,875,190
348R 3,875,189
378 3,875,191
397.1 3,875,193
3,875,194
397.4 3,875,188
3,875,195
397.7R 3,875,192
403 3,875,196
404 3,875,197
404.5 3,875,198
429R 3,875,199
439R 3,875,200
455B 3,875,201
458 3,875,202
465G 3,875,203
465.3 3,875,204
465.5R 3,875,205
467 3,875,206
471C 3,875,207
473R 3,875,208
473S 3,875,209
475R 3,875,210
486B 3,875,211
486R 3,875,212
490 3,875,213
499 3,875,214
501.15 3,875,215
512C 3,875,216
514J 3,875,217
515P 3,875,218
518R 3,875,219
530N 3,875,220
534R 3,875,221
535P 3,875,222
536 3,875,223
537R 3,875,224
541 3,875,225
544L 3,875,226
556A 3,875,227
562R 3,875,228
3,875,229
564RF 3,875,230
566AC 3,875,232
566B 3,875,231
570.7 3,875,233
570.9 3,875,234
585B 3,875,235
586G 3,875,236
590 3,875,237
591 3,875,238
596 3,875,239
604HF 3,875,240
611R 3,875,241
613R 3,875,242
617R 3,875,243
618E 3,875,245
618F 3,875,244
619B 3,875,246
621G 3,875,247
637P 3,875,248
651HA 3,875,249
654R 3,875,250
666PY 3,875,251
669R 3,875,252
683.3 3,875,253
827 3,875,254
836 3,875,255
857TW 3,875,129
860 3,875,256
3,875,257
869 3,875,258
876R 3,875,259
878R 3,875,260
899 3,875,261
900 3,875,262
928 3,875,263
932 3,875,264
964 3,875,265

CLASS 261

50A 3,875,266
70 3,875,267
88 3,875,268
91 3,875,279
111 3,875,269

CLASS 264

6 3,875,270
43 3,875,271
3,875,272
3,875,273
44 3,875,274
45.3 3,875,275
51 3,875,276
65 3,875,277
90 3,875,278
92 3,875,280
95 3,875,281
118 3,875,282
160 3,874,910
182 3,875,283
288 3,875,284

CLASS 266

20 3,874,644

CLASS 267

112 3,874,645
136 3,874,646

CLASS 269

228 3,874,647

CLASS 270

53 3,874,648
55 3,874,649

CLASS 271

4 3,874,650
3,874,651
35 3,874,652
64 3,874,653
99 3,874,654
3,874,655

CLASS 272

58 3,874,656
3,874,657
3,874,658
79R 3,874,659
81 3,874,660

CLASS 273

1R 3,874,661
26E 3,874,662
26R 3,874,663
29A 3,874,664
34A 3,874,665
73D 3,874,667
73R 3,874,666
81.3 3,874,668
85R 3,874,669
105.6 3,874,670
134AC 3,874,671
183B 3,874,672
186R 3,874,673

CLASS 277

8 3,874,674
11 3,874,675
22 3,874,676
27 3,874,677
29 3,874,678
37 3,874,679
96 3,874,680

CLASS 279

2R 3,874,681
50 3,874,688

CLASS 280

6H 3,874,682
10 3,874,683
11.35B 3,874,684
11.35K 3,874,685
11.37E 3,874,687
11.37H 3,874,686
33.99H 3,874,689
47.39 3,874,690
87.1 3,874,691
124F 3,874,692
150AB 3,874,693
3,874,694
3,874,695
150.5 3,874,696
154.5R 3,874,697
240 3,874,700
278 3,874,701
408 3,874,698
423R 3,874,702
425R 3,874,703
432 3,874,699
479R 3,874,704

CLASS 281

21 3,874,705

CLASS 285

24 3,874,706
93 3,874,707
3,874,708
104 3,874,709
137R 3,874,710
236 3,874,711
3,874,712
340 3,874,713
354 3,874,714

CLASS 292

75 3,874,715
175 3,874,716
346 3,874,717

CLASS 293

85 3,874,718

CLASS 294

81SF 3,874,719
86.26 3,874,720

CLASS 296

105 3,874,721
137G 3,874,722
137J 3,874,723

CLASS 297

88 3,874,724
133 3,874,725
239 3,874,726
320 3,874,727
330 3,874,728
445 3,874,729
452 3,874,730
3,874,731

CLASS 299

7 3,874,732
17 3,874,733
32 3,874,734
68 3,874,735

CLASS 301

63R 3,874,736

CLASS 302

15 3,874,737
21 3,874,738
24 3,874,739
31 3,874,740

CLASS 303

21AF 3,874,743
21BE 3,874,741
21F 3,874,742
3,874,744
3,874,745
22R 3,874,746
89 3,874,747

CLASS 307

9 3,875,421
88.3 3,875,422
113 3,875,423
117 3,875,424
154 3,875,425
205 3,875,426
228 3,875,427
229 3,875,428
246 3,875,429
297 3,875,430
298 3,875,431
299 3,875,432
308 3,875,433
3,875,434

CLASS 308

6R 3,874,748
9 3,874,749
10 3,874,750
26 3,874,751
238 3,874,752

CLASS 310

40 3,875,435
43 3,875,436
49 3,875,437
68C 3,875,439
68 3,875,438

CLASS 312

111 3,874,753
209 3,874,754
221 3,874,755
234 3,874,756
240 3,874,757
278 3,874,758

CLASS 313

96 3,875,440
104 3,875,441
193 3,875,442
274 3,875,443
330 3,875,444
348 3,875,445
368 3,875,448
414 3,875,446
465 3,875,447
466 3,875,449
471 3,875,450
482 3,875,452
487 3,875,453
488 3,875,454
489 3,875,455
498 3,875,451
501 3,875,456

CLASS 315

11 3,875,457
39.69 3,875,469
39.77 3,875,470
151 3,875,471
169TV 3,875,472
3,875,473
3,875,474
193 3,875,475
194 3,875,458
205 3,875,459
291 3,875,460

CLASS 317

2F 3,875,461
13R 3,875,462
3,875,463
3,875,464
61 3,875,465
62 3,875,466
3,875,467
98 3,875,476
3,875,477
101CC 3,875,478
101CM 3,875,479
123 3,875,480
246 3,875,481
262A 3,875,482

CLASS 318

118 Re.28,381
213 3,875,483
220R 3,875,484
227 3,875,485
341 3,875,486
485 3,875,487
575 3,875,468
648 3,875,488
691 3,875,489

CLASS 320

39 3,874,551
40 3,875,490

CLASS 321

5 3,875,491
16 3,875,492
18 3,875,493
27R 3,875,494
28 3,875,495
44 3,875,496

CLASS 324

3 3,875,497
3,875,498
3,875,499
37 3,875,502
57PS 3,875,500
62 3,875,501
3,875,503
65R 3,875,504
94 3,875,505
110 3,875,506
115 3,875,507
142 3,875,508
3,875,509
158MG 3,875,511
158SY 3,875,510

CLASS 325

67 3,875,512
105 3,875,513
316 3,875,514
323 3,875,515

CLASS 328

146 3,875,516
155 3,875,517
3,875,518
161 3,875,519

CLASS 330

10 3,875,520
29 3,875,521
30D 3,875,522
69 3,875,523

CLASS 331

1A 3,875,524
3,875,525
47 3,875,526
66 3,875,527
78 3,875,528
94.5C 3,875,529
94.5D 3,875,530
94.5G 3,875,531
94.5H 3,875,532
116R 3,875,533

CLASS 332

7.51 3,875,534
30V 3,875,535
31T 3,875,536

CLASS 333

28R 3,875,537
73S 3,875,538
79 3,875,539
84M 3,875,540
97R 3,875,541
3,875,542

CLASS 335

210 3,875,543
230 3,875,544

CLASS 336

110 3,875,545

CLASS 337

407 3,875,546

CLASS 338

219 3,875,547

CLASS 339

17CF 3,874,759
3,874,768
60R 3,874,760
3,874,761
91R 3,874,762
3,874,763
97R 3,874,764
103M 3,874,765
125R 3,874,766
147R 3,874,767
217S 3,874,769

CLASS 340

2 3,875,548
3E 3,875,549
5MP 3,875,550
5D 3,875,552
16R 3,875,553
21 3,875,554
38L 3,875,555
52D 3,875,557
52E 3,875,556
58 3,875,558
71 3,875,559
80 3,875,560
81R 3,875,561
166R 3,875,563
166 3,875,562
172.5 3,875,564
3,875,565
173R 3,875,566
3,875,567
174TF 3,875,568

CLASS 343

5LS 3,875,551
5R 3,875,569
6.5LC 3,875,570
6.5R 3,875,571
803 3,875,572
882 3,875,573

CLASS 346

1 3,875,574
44 3,875,575
74ES 3,875,576
3,875,578
74E 3,875,577
108 3,874,621

CLASS 350

7 3,874,778
96WG 3,874,779
3,874,780
3,874,782
96B 3,874,783
96C 3,874,781
109 3,874,784
161 3,874,785
3,874,786
214 3,874,770
3,874,771
247 3,874,772
288 3,874,773

CLASS 351

26 3,874,774
41 3,874,775
123 3,874,776
168 3,874,777

CLASS 353

15 3,874,787
111 3,874,788

CLASS 354

154 3,875,579
268 3,875,580
318 3,875,581

CLASS 355

5 3,874,789
16 3,874,790
41 3,874,791
67 3,874,792
68 3,874,793

CLASS 356

36 3,874,794
104 3,874,795
109 3,874,796
118 3,874,797
159 3,874,798
173 3,874,799
208 3,874,800

CLASS 358

8 3,875,.82
27 3,875,583
36 3,875,584
44 3,875,585
3,875,586
80 3,875,587

CLASS 360

15 3,875,588
78 3,875,589
96 3,875,590

CLASS 401

2 3,874,801

CLASS 403

49 3,874,802
92 3,874,803
353 3,874,804
360 3,874,805

CLASS 404

93 3,874,806
110 3,874,807

CLASS 408

1 3,874,808
3 3,874,809
14 3,874,810

CLASS 415

60 3,874,811
106 3,874,812
182 3,874,813
219C 3,874,814

CLASS 416

134 3,874,815
139 3,874,816
143 3,874,817
144 3,874,818
186 3,874,819
226 3,874,820

CLASS 417

235 3,874,821
311 3,874,822
356 3,874,823
406 3,874,824
519 3,874,825
565 3,874,826

CLASS 418

55 3,874,827
87 3,874,828
115 3,874,829

CLASS 423

54 3,875,285
86 3,875,286
101 3,875,287
118 3,875,288
306 3,875,289
328 3,875,290
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4 : 234,688
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8 : 234,695

9 : 234,727
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18 : 234,722
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40 : 234,714
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42 : 234,651
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44 : 234,723
47 : 234,715
48 : 234,658
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51 : 234,704

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6 : 3,697

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12 : 3,698

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U.S. DEPARTMENT OF COMMERCE
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